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Horæ Mathematicæ Vacuæ:

Or, a TREATISE of the

GOLDEN and ECLIPTICK NUMBERS.

[Price 1*s.* 6*d.*]

BRITISH MUSEUM

Horæ Mathematicæ Vacuæ:

Or, a TREATISE of the GOLDEN and ECLIPTICK NUMBERS.

CONTAINING,

I. An eaſy and certain Method for finding the Change of the Moon for any Time paſt or to come, from the Creation to the End of the World, by the Rectification of the GOLDEN NUMBER.
II. An eaſy and certain Method for finding the Eclipſes both of the Sun and Moon for any Time paſt or to come, from the Creation to the End of the World, by a Number of Years called, The ECLIPTICK NUMBER.
III. Of the Fractions of the Square and Cube Roots.

To which is added,

EXAMPLES for the Practice of the GOLDEN and ECLIPTICK NUMBERS, to find thereby the Change or Age of the Moon, taken out of *The Scripture Chronology demonſtrated by Aſtronomical Obſervations.*

By *ARTHUR BEDFORD*, M. A.
Chaplain to His Royal Highneſs FREDERICK Prince of *Wales*, and to the *Haberdaſhers Hoſpital* at *Hoxton*, near *London.*

Pſal. cxlvii. 5. *Great is our Lord, and great is his Power; yea, and his wiſdom is infinite.*
Pſal. xix. 1, 2, 3, 4, 5, 6. *The heavens declare the glory of God: and the firmament ſheweth his handy work. One day telleth another: and one night certifieth another. There is neither ſpeech nor language: but their voices are heard among them. Their ſound is gone out into all lands: and their words unto the ends of the world. In them hath he ſet a tabernacle for the ſun: which goeth forth as a bridegroom out of his chamber, and rejoiceth even as a giant to run its courſe. It goeth forth from the uttermoſt parts of the heaven, aud turneth about unto the end of it again: and there is nothing hid from the heat thereof.*

LONDON:
Printed for J. CLARKE, at the *Golden Ball* in *Duck-Lane*, near *Weſt-Smithfield.* 1743.

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ADVERTISEMENT.

THE Author hereof labouring under a long and painful Sciatica, which hath deprived him of the Uſe of his Limbs, and being willing to divert his melancholy Thoughts by ſome Amuſement, happened to pitch upon the Compoſing of the following Treatiſe; which being ſhewn to a Perſon of eminent Skill in Aſtronomy, and he judging, that it might be of ſome Service, it is accordingly expoſed to the World, and humbly dedicated to THE ROYAL SOCIETY, hoping for a candid Conſtruction, and deſiring that ſome one or other of them will be pleaſed to correct thoſe Miſtakes, which muſt unavoidably happen in ſuch Circumſtances, and render it more fit for publick Service.

The

The CONTENTS.

Chap. I. *An eaſy and certain Method for finding the Change of the Moon for any Time paſt or to come, from the Creation to the End of the World, by the Rectification of the* GOLDEN NUMBER Page 1

Chap. II. *An eaſy and certain Method for finding the Eclipſes both of the Sun and Moon for any Time paſt or to come, from the Creation to the End of the World, by a Number of Years called,* The ECLIPTICK NUMBER 16

Chap. III. *Of the Fractions of the Square and Cube Roots* 29

A CATALOGUE of the TABLES at the End of this TREATISE.

Table I. *A Table of the Revolutions of the* Lunar Cycle *to be ſubſtracted from the* New Moon *in the Calendar for the Years after* Chriſt, *and added to it for the Years before* Chriſt's Nativity Page 33

Table II. *A Table of the* Solar Revolutions *to be added to the* Sun's *Place in the* Calendar *for the Years after* Chriſt, *and ſubſtracted from it for the Years before* Chriſt's Nativity ibid.

Table III. *or, The* CALENDAR. from 34 to 36

Table IV. *The* Lunar Table *for every Month in the Year* from 37 to 48

Table V. *A Table of the Revolutions of the Ecliptick Cycle, to be ſubſtracted from the mean Conjunction,* Table VII. *for the Years after Chriſt's Nativity, and added for the Years before it* 49

Table VI. *A Table of the Sun's Place to be added to its Place in* Table VII. *for the Years after Chriſt's Nativity, or ſubſtracted from the Table for the Years before it* ibid.

Table VIII. *The* Ecliptick Calendar *for every Month in the Year* from 50 to 61

Examples for the Practice of the Golden Number, *to find thereby the Change or Age of the Moon, taken out of* The Scripture Chronology demonſtrated by Aſtronomical Obſervations 62

Examples for the Practice of the Ecliptick Number 70

Of

Of the MARKS *uſed in this* TREATISE.

THE twelve Signs, ♈ Aries, ♉ Taurus, ♊ Gemini, ♋ Cancer, ♌ Leo, ♍ Virgo, ♎ Libra, ♏ Scorpio, ♐ Sagittary, ♑ Capricorn, ♒ Aquarius, ♓ Piſces.

☉ The Sun.

☽ The Moon.

☌ Conjunction, or when two Planets are in the ſame Degree, Minute or Second of the Ecliptick Line, or one of them is with the Dragon's Head, or Dragon's Tail.

☍ Oppoſition, or when two Planets are in the ſame Manner in the oppoſite Parts of the Ecliptick Line.

Middle ☌ ☉ ☽. Middle Conjunction of the Sun and Moon, when the real Conjunction may be ſometimes ſooner, and ſometimes later.

Middle ☍ ☉ ☽. Middle Oppoſition of the Sun and Moon, when the real Oppoſition may be ſometimes ſooner, and ſometimes later.

☊ The Dragon's Head, or the Point of the Ecliptick, which when the Moon paſſeth, ſhe increaſeth in North Latitude, until ſhe is come to the greateſt of all.

☋ The Dragon's Tail, or the Point of the Ecliptick, which when the Moon paſſeth, ſhe increaſeth in South Latitude, until ſhe is come to the greateſt of all.

Middle ☌ ☉ ☊. The Middle Conjunction of the Sun and Dragon's Head, when the real may be ſometimes ſooner, and ſometimes later.

Middle ☌ ☉ ☋. The Middle Conjunction of the Sun and Dragon's Tail, when the real alſo may be ſometimes ſooner, and ſometimes later.

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OF THE
GOLDEN NUMBER.

CHAP. I.

An eaſy and certain Method for finding the Change of the Moon for any Time paſt or to come, from the Creation to the End of the World, by the Rectification of the GOLDEN NUMBER.

BEFORE the Science of *Aſtronomy* was arrived to any Perfection, the Antients, and more particularly the *Jews* and the *Greeks*, reckoned their *Years* as ſo many *Revolutions* of the *Sun* to the ſame Point of the Heavens, as near as they could gueſs, ſo as to make the Year begin at the ſame Seaſon, either Summer, Winter, Autumn, or Spring. And when they found a ſenſible Difference, they rectified it by adding or ſubſtracting ſeveral Days by publick Authority. And they alſo reckoned their *Months* to begin from the firſt Appearance of the *Moon* in the Evening after her Change. And when they found any Miſtake, they rectified their *Months* in the ſame Manner, as they rectified their Years. Accordingly they ſoon began to think of a certain *Cycle* or Number of *Years*, at the End of which both the *Luminaries* would be in the ſame Poſition. This at firſt they ſuppoſed would be at the End of three *Years*, which they called *Trieteris*. But this being too much they added five more *Years* to it, and made it to conſiſt of eight *Years*, which they called *Octoeteris*. This Space of Time being too little they added three *Years* more, and made the Number to conſiſt of eleven *Years*, which they called *Endecaeteris*. But this alſo being too much, ſo that none of them anſwered exactly, and this laſt was more diſtant from the Truth than the former, at laſt *Meto*, a famous Philoſopher of *Athens* in *Greece*, about the *(a)* Year before *Chriſt's Nativity* 432 according to the *Vulgar Account*, added eight Years more to the *Cycle*, and made it to conſiſt of nineteen Years, which they called *Enneadecaeteris*; and which they reckoned did come up to the utmoſt Exactneſs, ſo that it would ſhew the Days of the *new Moons* for ever. This Opinion continued for ſeveral Ages, inſomuch that the General Council of *Nice*, in the *Vulgar* Year after *Our Saviour's Nativity* 325 (though ſince the Time of *Meto* to that Time there was a conſiderable Alteration, and the Moon came to her Changes two Days and near an half ſooner than in *Meto*'s Time, and though they rectified the Days to the Year of their Seſſions, yet they) made a *Table* and a Rule alſo from thence, how by the Help of this *Cycle*, (which for the Excellency of its Uſe was accordingly called *The Golden Number*, and was probably marked in the *Calendar* with golden *Figures)* *Eaſter*, as they thought, might be found for ever, both which are inſerted in our *Liturgy*. And there we may alſo obſerve this Rule, that the *Eaſter Day is always the firſt Sunday after the Full Moon, which happens next after the one and twentieth Day of March*. This was the Day when the *Sun* in that Age of the World touched the *Equinoctial Line* in the firſt Point of *Aries*, and determined the *Jewiſh Paſſover* to the fourteenth of the ſame Month, or the *Full Moon*. For the *Jews* did not begin their Years from the Change of the *Moon*, which happened firſt after the *Sun's* Entrance into *Aries*, but the *Full Moon* immediately

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(a) Archbiſhop Uſher's Annals, *Vol.* I. *Page* 202.

ately following it was the *Middle* of the *firſt Month*, though it might ſometimes begin a Fortnight before the *Sun* came to the *Equinoctial Point*. However to this the *Council* added, *And if the Full Moon happens on a Sunday, then Eaſter Day is the Sunday after*. This they did to ſettle a Controverſy, which was very hot in that Age, Whether the *Chriſtian Paſſover* ſhould be obſerved on the ſame Day of the Week with the *Jews*, let it happen on what Day of the Week ſoever, or on a *Friday*, which we call *Good Friday*, that ſo the *Eaſter* Day might be on the *Sunday* following, as being the Day, on which Our *Bleſſed Saviour* roſe from the Dead. This *Cycle* was imagined to begin the Year after the *Moon* changed on the laſt Day of *February*, which for Example was ſuppoſed to happen in the firſt Year after the *Nativity* of *Our Saviour* according to the *Vulgar Account*, though I know not according to what antient Computation it will anſwer exactly. I am ſure, that it anſwers to the preſent Age, as it appears from the *Calculation* for the Year 1747 in the Margin, taken out of the *Table* of the *Moon's middle Motion* from the *Sun*, by which it appears, that the *middle Change* of the *Moon* for that Year, when the *Golden Number* will be 19, will be on *Feb.* 28^d^ 10^h^ 47^m^ before Noon. And therefore if the *Epact* was altered in the firſt Co-

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    1747
       1
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19)1748(92
    171
    ---
     38
     38
    ---
     00
    ---
```

	s.	d.	m.	s.
Anno 1741	9	21	26	2
Years 6 —	2	9	55	48
February	0	17	54	47
Day 28 —	11	11	20	27
Total —	0	0	37	4
Hour 1 —	0	0	30	29
Remains —	0	0	6	35
Min. 13 —	0	0	6	36
Difference	0	0	0	1

	d.	h.	m.
From February	28	12	0
Subſtract ——	0	1	13
Remains	28	10	47 A. M.

lumn of the *Calendar* of our Liturgy, and the *Number* 19 inſtead of being placed oppoſite to the fifth Day of *March* was altered to the twenty eighth Day of *February*, and the reſt were altered according to the Rule for that Purpoſe, it would ſhew the Day of the *Moon's* Change for this Century without any conſiderable Difference.

But to proceed from this Digreſſion. If you would find out the *Golden Number* for any Year of *Chriſt* according to the *Vulgar Account*, there was only this Rule antiently given: *Add an Unite to the given Year, and divide the whole by* 19, *and the Remainder is the Golden Number for that Year. And if* 00 *Remains*, the *Golden Number for that Year is* 19. Thus to the Year 1747 I add an *Unite*, and the Total is 1748, which I divide by 19, and the Remainder is 00, which ſhews the *Golden Number* to be 19, and ſo it is in the *Table* of the *Moveable Feaſts* in our *Liturgy*. This Number being thus ſettled, they afterward added another, which they called *The Epact*, and which may be ſtill ſeen in our *Liturgy* in the *Table of the Moveable Feaſts* uſually *calculated for forty Years*. This was alſo intended for the eaſy and perpetual finding out the Days in each Month of the Year, on which the *Moon* changed. The Method was this. They obſerved, that twelve *Lunar Months* came eleven Days ſhort of a *Solar Year*; and that a *Lunar Month* conſiſted ſometimes of nine and twenty, and ſometimes of thirty Days. So that ſuppoſing the *Moon* changed on the laſt Day of *February*, when the *Golden Number* was 19, it will be eleven Days old on the laſt Day of *February* in the Year following, and then the *Golden Number* being 1, the *Epact* will be 11. By adding 11 more it appears, that when the *Golden Number* is 2, the *Epact* will be 22. By adding 11 more the *Total* will be 33, which being above 30, or the uſual Days of a *Lunar Month*, the Number 30 muſt be ſubſtracted from it, and the Remainder is 3, even the ſame with the *Golden Number*; as it is alſo, when the *Golden Number* is 6, 9, 12, 15 or 18. If then the *Golden Number* exceeds either of the former by 1, there muſt be added 11; and if it exceeds it by 2, there muſt be added 22; and if from the Total there is ſubſtracted 30, whenever Occaſion requires it, the Product will be the *Epact* for that Year.

Another Way for the finding the *Epact* is this. Multiply the *Golden Number* for the Year propoſed by 11. If the Product is leſs than 30, it is the *Epact* for that Year. If it exceeds 30, divide the ſame by 30, and the Remainder is the ſame for that Year.

As for Example. The preſent Year is 1742, to which I add an *Unite*, and the *Total* is 1743, which being divided by 19, the *Quotient* is 91, or as many *Revolutions* of the *Golden Number*, as have happened ſince the Year of *Chriſt* 1, and the *Remainder* is 14, or the *Golden Number* for this Year, which alſo appears from the *Table of the Moveable Feaſts* in the Beginning of our *Liturgy*.

The *Golden Number* being known, I find the *Epact* thus. The laſt Number, when both theſe were equal, was 12, but this having exceeded the other by 2, I add 22, and the Total being 34, I ſubſtract 30, and the Remainder is 4, or the *Epact* for the preſent Year.

Or thus, I multiply 14 or the *Golden Number* by 11, and the *Total* is 154, which being divided by 30, the *Remainder* is alſo 4 or the *Epact* for this preſent Year, as it alſo appears from the *Table of the Moveable Feaſts* at the Beginning of our *Liturgy*.

The Uſe of the *Epact* is to find the Day of any given *Month*, when the *Moon* changes, after this Manner. For the *Month* of *March* I take the Number 1. But to the Number of the Months from *March* incluſively I add the *Epact* for the ſaid Year. If the Number is leſs than 30, I ſubſtract 30; if it is more than 30, I ſubſtract it from 60, and the *Remainder* is the Day of the *Month*, in which according to this Computation the *New Moon* ſhould happen.

Only it muſt be obſerved, that in the *Month* of *January* the *New Moon* is on the ſame Day with that of *March*; and in the *Month* of *February* it is a Day ſooner.

For Example. I would know the Day of the Month of *November*, in this Year, when according to this Computation the *New Moon* is to happen, I find the *Epact* for this Year to be 4, and the *Month* of *November* is the ninth *Month* incluſively from *March*, both which *Numbers* make 13, which being ſubſtracted from 30 the Remainder is 17; or the Day of the ſaid Month in which the *Moon* is ſuppoſed to change. According to the *Table* of the *middle Motion* of the *Moon* from the *Sun*, the Change would be on *November* 16^{d} 7^{h} 52^{m} 18^{s} in the Morning. And according to Calculation the *Sun* is eclipſed not far from the ſame Time. But in our *Calendar* the Number 14, (which ſhews the Changes for this Year) is put over againſt the Day of the *Month* 21; ſo that there are about 5 Days Difference. This ſhews us, how neceſſary it is to make an Alteration in that *Column* of our *Calendar*, and that it hath not been altered ſince the *Council* of *Nice*; for that is nearly the Difference between what it was then, and what it is now. *(a)*

But ſince the vaſt Improvements, which have been made in the noble Science of *Aſtronomy*, it appears, that the *Moon* comes to her Change ſometime ſooner than at the End of 18 *Julian* Years. The learned *Biſhop Beveridge* (to whoſe accurate Judgment I pay the utmoſt Deference) tells us, *(b)* " That the 19 " Years of the *Moon's Cycle* is leſs than 19 *Julian* " *Years* by 1^{h} 27^{m} 31^{s} $55'''$." And he farther adds, that " this may be demonſtrated from the Collection of " both. For according to the moſt ſkilful Perſons in " *Aſtronomy* a *Lunar Month* conſiſts of 29^{d} 12^{h} 44^{m} " 3^{s} $11'''$, which multiplied by 12 produces the " Quan-

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(a) He who would be more fully informed in both theſe Particulars, may conſult Biſhop Beveridge *his* Chronology, *Book* II, *Chap*. 4, *and* 6, *firſt printed in the Year* 1667, *and afterward reprinted in the Year* 1705.

(b) Biſhop Beveridge *his* Chronology, *Book* II. *Chap*. 4. *Sect*. 3.

“ Quantity of a common Year to be $354^d\ 8^h\ 48^m\ 38^s$
“ $12'''$, which being multiplied by 19 produces
“ $6732^d\ 23^h\ 4^m\ 5^s\ 48'''$. Let there be added 7 *Embolimæan*
“ or ſupernumerary Months (for ſo many
“ are alſo contained in a Revolution of 19 Years) or
“ $206^d\ 17^h\ 8^m\ 22^s\ 17'''$, and the Sum Total will be
“ $6939^d\ 16^h\ 32^m\ 28^s\ 5'''$. But 19 *Julian* Years make
“ $6939^d\ 18^h$. Subſtract therefore $6939^d\ 16^h\ 32^m\ 28^s$
“ $5'''$ out of $6939^d\ 18^h$, and the Remainder will be
“ $0^d\ 1^h\ 27^m\ 31^s\ 55'''$. So that if the *New Moon*,
“ when he wrote his Treatiſe of *Chronology*, did
“ happen on *January* $21^d\ 10^h$ after Midnight, the
“ *New Moon* after the Run of 19 Years would happen
“ again at the ſame Day, but not at the ſame
“ Hour of the Day, namely at the tenth, but at 8^h
“ $32^m\ 28^s\ 5'''$. And hence it happens, that in 16
“ *Cycles* or 304 Years this *Anticipation* of the *Moon*
“ amounts to $23^h\ 20^m\ 30^s\ 43'''$. But in about 312
“ Years there is an *Anticipation* of a whole Day; ſo
“ that the ſame *New Moon*, which in that Year happened
“ in *January* $21^d\ 10^h$, will return back at the End of 312
“ Years to *January* $20^d\ 10^h$, and will alſo at the End of
“ 312 Years more return farther back to *January* 19^d
“ 10^h, and ſo ſucceſſively.” So that from the Council of *Nice* in the Year 325 to the Year 1573 there were four Days Difference, and in the Year 1885 there will be five Years Difference, and the longer the World laſts, the Difference will ſtill be greater and greater. And this is the Reaſon, that the *Full Moon* preceding the *Eaſter Sunday* doth not always happen in the *Paſſion* Week, according as it was intended to be ſettled for ever by the Council of *Nice*, and as it is inſerted in the Beginning of our *Liturgy*; but that the ſaid *Full Moon* very often happens in the Week before it. *(a)*

To calculate this with the utmoſt Exactneſs I may take any large Number of Years; but I particularly fix

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(a) See Dr. Prideaux *his* Hiſtorical Connexion of the Old and New Teſtament. *Vol.* II. *Part* 1. *Preface, where this is handled more largely.*

fix upon 312 multiplied by 19, or 5928 Years, at the End of which, according to *Biſhop Beveridge* his general Account, the Difference would be 19 Days, but according to Calculation it is 2^h 16^m 50^s too much, as appears from what follows.

Middle Motion of ☽ from ⊙.

	s.	d.	m.	s.
Years 5000	7	24	14	10
Years 900	8	3	45	45
Years 20	4	13	25	1
Years 8	11	11	22	0
Total is ——	7	22	46	56
Subſt. Days 19	7	21	37	27
Remains ——	0	1	9	29
Hours 2 ——	0	1	0	57
Remains ——	0	0	8	32
Min. 16 ——	0	0	8	7
Sec. 50 ——	0	0	0	25

The Proof hereof is alſo taken from the *Tables* of the *Middle Motion* of the *Sun* and *Moon*, thus,

⊙'s Middle Motion.	s.	d.	m.	s.	☽'s Middle Motion.	s.	d.	m.	s.
Years 5000	1	7	46	40	Years 5000	9	2	0	50
Years 900	0	6	48	0	Years 500	8	10	33	45
Years 20	0	0	9	4	Years 20	4	13	34	5
Years 8	0	0	3	37	Years 8	11	11	25	37
Total is ——	1	14	47	21	Total is ——	9	7	34	17
Days 19 Subſt.	0	18	43	38	Days 19 Subſt.	8	10	21	5
Remains ——	0	26	3	43	Remains ——	0	27	13	12
Hours 2. Subſt.	0	0	4	56	Hours 2 ——	0	1	5	53
Remains ——	0	25	58	47	Remains ——	0	26	7	19
Min. 16 ——	0	0	0	39	Min. 16 ——	0	0	8	47
Remains ——	0	25	58	8	Remains ——	0	25	58	32
Sec. 50 ——	0	0	0	2	Sec. 50 ——	0	0	0	27
Remains ——	0	25	58	6	Remains ——	0	25	58	5

both alike.

Accordingly I find by the *Rule of three*, that if 312 *Revolutions* of the *Cycle* of the *Moon* make 19^d 2^h 16^m 50^s, then one of thoſe *Revolutions* ſhall make 1^h 28^m 7^s 51$^{'''}$ 9$^{''''}$, which is the Space by which the *middle Change* of the *Moon* at the End thereof is leſs than 19 Years, which I accordingly prove from the *Table* of the *Moon's* middle *Motion* from the *Sun*, and the *Tables* of the *middle Motion* of the *Sun* and *Moon*, thus.

Middle Motion of ☽ from ☉.	s.	d.	m.	s.
Years 19	11	21	36	11
Hours 18	0	9	8	35
Total	0	0	44	46
Hour 1	0	0	30	29
Remain	0	0	14	17
Min. 28	0	0	14	13
Sec. 8	0	0	0	4

Middle Motion of ☉	s.	d.	m.	s.
Years 19	11	29	24	15
Hours 18	0	0	44	21
Total	0	0	8	36
Hour 1	0	0	2	28
Remain	0	0	6	8
Min. 28.	0	0	1	9
Remain	0	0	4	59
Sec. 8	0	0	0	0
Remain	0	0	4	59

Middle Motion of ☽.	s.	d.	m.	s.
Years 19	11	21	0	26
Hours 18	0	9	52	56
Total	0	0	53	22
Hour 1	0	0	32	56
Remain	0	0	20	26
Min. 28	0	0	15	22
Remain	0	0	5	4
Sec. 8	0	0	0	5
Remain	0	0	4	59

With which I make the *Tables* of the *Revolutions* of the ☊ ☉ ☽ in nineteen Years at the End of this Book. *Table* I.

And as it appears in *Biſhop Beveridge* his Account, that 304 Years make a Difference of 23^h 20^m 30^s 40$^{'''}$; ſo eight Years will make a Difference of 36^m 51^s 20$^{'''}$; and conſequently the Difference of 312 Years will be 23^h 57^m 22^s 0$^{'''}$. So that it comes ſhort of a Day 2^m 38^s, and therefore the Deficiency in 19 Times ſo much or in 5928 Years will be 50^m 2^s, which being of the ſame Nature with the other, namely, leſs than the full Time, I ſubſtract it accordingly from 2^h 16^m 50^s, and the Remainder is 1^h 26^m 48^s, or the Difference in 5928 Years. Now if the Difference in 5928 Years is 1^h 26^m 48^s, then the Difference in 304 Years will be 4^m 27^s 4$^{'''}$ 36$^{''''}$, and a Difference in a *Revolu-*

tion of the *Cycle* of 19 Years, or 235 *Moons* will be $16^{s}\,42^{\prime\prime\prime}\,43^{\prime\prime\prime\prime}$. And the Difference of one *Moon* will be $4^{\prime\prime\prime}\,18^{\prime\prime\prime\prime}$, which I add to *Biſhop Beveridge* his *Lunar Month* or $29^{d}\,12^{h}\,44^{m}\,3^{s}\,11^{\prime\prime\prime}$, and the real *Lunary* Month is $29^{d}\,12^{h}\,44^{m}\,3^{s}\,15^{\prime\prime\prime}\,18^{\prime\prime\prime\prime}$, the half of which is $14^{d}\,18^{h}\,22^{m}\,1^{s}\,37^{\prime\prime\prime}\,39^{\prime\prime\prime\prime}$. Which Length of the *Lunar Month* will alſo appear from the following *Calculations* taken out of the *Tables* of the *middle Motion* of the *Moon* from the *Sun*, and the *Tables* of the *middle Motions* both of the *Sun* and *Moon*.

Middle Motion of ☽ from ☉.					Middle Motion of ☉.					Middle Motion of ☽.				
	s.	d.	m.	s.		s.	d.	m.	s.		s.	d.	m.	s.
Day 29	11	23	31	53	Day 29	0	28	35	2	Day 29	0	22	6	55
Hours 12	0	6	5	43	Hours 12	0	0	29	34	Hours 12	0	6	35	18
Min. 44	0	0	22	22	Min. 44	0	0	1	48	Min. 44	0	0	24	9
Sec. 3	0	0	0	2	Sec. 3	0	0	0	0	Sec. 3	0	0	0	2
Total	0	0	0	0	Total	0	29	6	24	Total	0	29	6	24

This being done, I make a *Table* of the Exceſs of the *Sun* in each *Revolution* of the *Lunar Cycle*, or *Table* 2. And becauſe I find in the *Table* of its *middle Motion*, that the *Exceſs* in 20 Years is $9^{m}\,4^{s}$, therefore the Exceſs in one Year is $27^{s}\,12^{\prime\prime\prime}$, and in 19 Years it is $8^{m}\,36^{s}\,48^{\prime\prime\prime}$, which is the *Original Number*.

After this I make a *Calendar* of the *Number* of *Days* in each *Month* of the *Year* either *Common* or *Biſſextile* from the *firſt Day* of *January* incluſively, as you will alſo find in *Table* III.

And as it is indifferent, in what *Year* the *Cycle* begins; ſo for the better Conveniency of *Calculation* I ſuppoſe it to begin in the *Year* of *Chriſt* 00 according to the *Vulgar Account*, which may accordingly be computed either forward or backward. This is a *Biſſextile Year*, and the *Year* both before it and after it will be the *Number* 1, and the fourth *Year* both before it and after it being a *Biſſextile* or *Leap Year* will be the *Number* 4, &c.

This being done I make a *Calendar* for each *Month* of the *Year*, or *Table* IV. which I divide into nine *Columns*. The firſt and laſt *Columns* I leave blank to be filled up with the *Golden Numbers*. The ſecond I fill up with the *Day* of the *Year*. The third and fourth *Columns* ſerve for the 19 firſt *Years* after *Chriſt's Nativity*. In the firſt of theſe are inſerted the *middle Change* of the *Moon* oppoſite to the *Golden Number*, and the other ſhews the *Sun's Place*, both which I accordingly fill up, as they ſhall appear in their *ſeveral Calculations*. In the *fifth Column* I place in the ſame Manner the *Change* of the *Moon*, and the Place of the *Sun* for the *Year* of *Chriſt* 00. And in the ſixth and ſeventh *Columns* I alſo write down the *middle Changes* of the *Moon*, and the Place of the *Sun* for the *Years* before *Chriſt's Nativity* in the ſame Manner as the *third* and *fourth*, the whole being calculated for the *Meridian* of *London*. The *eighth Column* is filled up with the *Day* of the *Month*, and the *ninth* with the *Golden Number*.

Having thus prepared Matters for *Calculation*, I begin with the *Change* of the *Moon* for *January* in the firſt *Year* after *Our Saviour's Nativity* according to the *Vulgar Account*. And the Work will ſtand thus from the *Aſtronomical Calculations* of the *middle Motion* of the *Moon* from the *Sun*.

	d.	h.	m.	s.
Anno Chriſti 1 —	6	24	9	42
Comp. Circle — —	5	5	50	18
Day 12 — — —	4	26	17	20
Remains — —	0	9	32	58
Hours 18 — —	0	9	8	35
Minutes 48 — —	0	0	24	23

So that the *Middle* of ☌ ☉ ☽ *Anno Chriſti* 1, is *January* 12^{d} 18^{h} 48^{m} 00^{s}.

The Proof hereof is beſt known by finding out the Places of ☉ and ☽ at the Time mentioned out of the *Tables* of their *middle Motion*. Thus,

☉'s Place.

	s.	d.	m.	s.
Anno Chriſti 1	9	7	53	3
January 12 —	0	11	49	40
Hours 18 —	0	0	44	21
Minutes 48 —	0	0	1	58
☉'s Place is —	9	20	29	2

☽'s Place.

	s.	d.	m.	s.
Anno Chriſti 1	4	2	2	45
Day 12 —	5	8	7	0
Hours 18 —	0	9	52	56
Minutes 48 —	0	0	26	21
☽'s Place is —	9	20	29	2

Difference 00^{m} 00^{s}.

Accordingly in the *Calendar* over againſt *Jan.* 12. in the firſt *Column* I place the *Number* 1, to ſhew the *Golden Number*. In the third *Column* I place the Time of the middle ☌ ☉ ☽ or 18^{h} 48^{m} 00^{s}. And in the fourth *Column* I put the *Sun's Place* found out by *Calculation*, or ♑ 20^{d} 29^{m} 2^{s}.

This being done I proceed to the ſame *Calculation* for the *Month* of *February*, thus,

	d.	h.	m.	s.	‴	⁗
Middle ☌ ☉ ☽ Jan. — — —	12	18	48	0	0	0
Add the Space from Change to Change	29	12	44	3	15	18
Total is	42	7	32	3	15	18

Which anſwers to *Feb.* 11, as appears from the *Table* of the *collected Days* for the *Year* of *Chriſt* 1. *Col.* 2. The *Year* being a *common Year*.

The Proof of this depends on the *calculating* the Places of the *Sun* and *Moon* as before.

☉'s Place.

	s.	d.	m.	s.
Anno Chriſti 1	9	7	53	3
February 11 —	1	11	23	50
Hour 7 —	0	0	17	15
Minutes 32 —	0	0	1	19
Seconds 3 —	0	0	0	0
Total — —	10	19	35	27

☽'s Place.

	s.	d.	m.	s.
Anno Chriſti 1	4	2	2	45
February 11 —	6	13	24	31
Hours 7 —	0	3	50	35
Minutes 32 —	0	0	17	4
Seconds 3 —	0	0	0	2
Total — —	10	19	35	27

Difference 00.

Accordingly in the firſt *Column* over againſt *Feb.* 11. I put the *Figure* 1 for the *Golden Number*. In the third

Column I put $7^h\ 32^m\ 3^s$, for the Middle ☌ ☉ ☽, and in the fourth *Column* I put ♒ $19^d\ 35^m\ 27^s$ for the *Sun's* Place thus found by *Calculation*. And in the ſame Manner I go on with all the reſt, until the whole Work is compleated, as you will ſee in the *Calendar*. *Table* III.

The *New Moon* being thus known, the *Full Moon* is alſo eaſily known thus.

To the Time of the *New Moon* in *Table* III. add 14^d $18^h\ 22^m\ 1^s$, and the Total is the Time of the *Full Moon*.

But here it muſt be obſerved, that theſe *Calculations* do not always give the exact Time of the *New* and *Full Moons*, but only according to the *middle* or *equal Motion*. For though ſometimes it may happen exactly, yet at other Times it will be either ſooner or later, and ſometimes more or leſs. And though it rarely exceeds fourteen Hours, yet the Difference may be above nineteen Hours, which is occaſioned by one Irregularity in the *Sun's Motion* and two in the *Moon's*.

	d.	m.	s.
That of the *Sun's* is its Diſtance from its *Apogæum* or *Perigæum*, when its greateſt Irregularity may be - - - - - - - - - - - -	1	56	20
The firſt of the *Moon* may be its Diſtance according to the *Mean Anomaly* of the *Sun*, which is called its *Partes Phyſicæ*, when its greateſt Irregularity may be - -	0	11	30
The third of the *Moon* is its Diſtance from its *Apogæum* or *Perigæum*, where the Difference is very great, and ſometimes greatly increaſed by its *Eccentricity*, when its greateſt Irregularity may be - - - - -	7	39	53
The Total is	9	47	43

Which converted into Time may happen to be 19 *Hours* Difference. As thus, from

	d.	m.	s.
	9	47	43
Hours 19 Subſtract	9	39	4
Remains	0	8	39
Min. 17	0	8	38
Sec. 2	0	0	1

So that he who would be more exact, muſt take the whole Pains of a particular *Calculation* from *Aſtronomical Tables.*

But to prevent any Miſtake, which may happen by the Intervention of the additional Day in the *Biſſextile* or *Leap Year*, theſe following Directions muſt be obſerved.

If the *Year* required, in which the *Change* of the *Moon* is ſought for, is a *Biſſextile* or *Leap Year*, and after a Diviſion by 19 the Remainder is 4, 3, 12 or 16, it ſtands without any Alteration.

If it is a *Biſſextile Year*, and the Remainder is any other Number, a Day muſt be added after the 28th *Day* of *February*. Thus the 29th *Day* of *February* muſt be reckoned as the firſt *Day* of *March*, and the firſt Day of *March* muſt be reckoned as the ſecond *Day* of *March*, &c.

But if it be not a *Leap Year*, let the *Sum* in the *Remainder*, or the *Golden Number* be ſuppoſed to be divided into theſe following Parts, *viz.* from 1 to 4, from 5 to 8, from 9 to 12, from 13 to 16, and from 17 to 19, or the End, which I call *a Quaternion*. And then if the Biſſextile happens to be before the *Year* ſought in the ſaid *Quaternion*, there muſt one Day be added to the *Day* of the *Month* throughout the whole *Year*. If the ſaid *Year* happens to be the laſt Number of the *Quaternion*, a Day muſt be added until the firſt Day of *March* and no longer. But if the *Biſſextile* is after the *Year* required in the ſaid *Quaternion*, the *Year* ſtands without any Alteration.

If the *Remainder* is 17, 18, or 0, it is the ſame in Effect, as if it was 1, 2 or 3.

If the *Remainder* is 00, the *Golden Number* is 19, and the *Quotient* in the *Diviſion* muſt be reckoned as one leſs than it really is.

The Uſe of the *Tables*, which I have made, is this. If you would know the *Change* of the *Moon* for any *Month* in any *Year* given, either before or after the *Year* of *Chriſt's Nativity*, divide the ſaid *Year* by 19, the *Quotient* ſhews the *Number* of the *Revolutions* of the *Lunar Cycle* from the *Year* of the *Nativity*, and the *Remainder* ſhews the *Golden Number*. Look into the *Calendar* for the ſaid *Number*, and from the *Table* of the *Lunar Cycle* take the *Number* of *Revolutions*, which you muſt ſubſtract from the Time of the *Conjunction* in *Table* IV. if it is the *Year* before *Chriſt's Nativity*, or add to it, if it is the *Year* after his *Nativity*, and the *Product* will ſhew the *middle Change* of the *Moon*.

Then take the *Sun's Place* from the ſecond *Table*, and add the Difference there found according to the *Number* of *Revolutions* in the former *Quotient*, which muſt be added to its Place found out in *Table* IV. by the Help of the *Golden Number* as before, if it is in any *Year* after *Chriſt's Nativity*; or ſubſtract from it, if it is any *Year* before it, and the *Product* will ſhew the *Sun's middle Place* in the *Ecliptick* at that Time.

Note, That as the *Year* of *Our Saviour's Nativity* or 00 is a *Biſſextile* or *Leap Year*; ſo in all *Aſtronomical Calculations* for the Years before it, if the *Year* of *Chriſt* 00 is inſerted in the *Chronological Tables*, a *Year* and a *Day* muſt be taken ſeparately for that *Year*, and afterward the *Operation* muſt be for the *Year* mentioned in the *Table* accordingly. But if the *Year* 00 is omitted, as it uſually is, ſuch a *Year* muſt alſo be taken ſeparately, and the *Operation* muſt be made for a *Year* leſs than what is mentioned in the *Chronological Table*. And thus the *Biſſextile Years* will be the ſame with theſe that come after. And alſo the *Years* before

Chriſt's Nativity 4, 8, 12, 16, *&c.* will be *Biſſextile* or *Leap Years*, like thoſe which follow after. Of this there will be frequent Examples in the following Part of this *Treatiſe*.

CHAP. II.

An eaſy and certain Method for finding the Eclipſes both of the Sun and Moon for any Time paſt and to come, from the Creation to the End of the World, by a Number of Years called the ECLIPTICK NUMBER.

THE *Eclipſes* of the *Sun* and *Moon* are occaſioned by the *Moon's* paſſing through either of the *Nodes* or *Points* of the *Ecliptick Line*, which we commonly call *the Dragon's Head*, and *the Dragon's Tail*, and are marked thus ☊ ☋.

The *Eclipſe* of the *Moon* is occaſioned by the Interpoſition of the Earth between the *Sun* and *Moon*, and is always at the *Full Moon*, or ſo very near it, that the Diſtance between the *true Oppoſition* and the *greateſt Obſcuration* could never have been known except from (*a*) the Rules of *right angled Spherical Trigonometry*; and never exceeds 6^{m} 50^{s}. And as the Shadow of the Earth affects the very Body of the *Moon*, ſo the *Eclipſe* of the *Moon* is the ſame in all Parts of the World (wherever it is viſible) at the ſame Time.

(*a*) *For the* Place *of the* Moon *in the* Ecliptick Line *is known by a* great Circle *from the* Poles *thereof, which always cuts the* Ecliptick Line *at* right Angles. *But the* greateſt Obſcuration, *or middle of the* Eclipſe *is taken from a* Point *of the* Ecliptick Line, *from whence a* great Circle *croſſes the* great Circle *of the* Moon's *Place in her* Orbit *at* right Angles; *and conſequently the Diſtance of the true* Oppoſition *from the* greateſt Obſcuration *is either more or leſs according to the* Latitude *of the* Moon, *or her greater or leſs Diſtance from either of the* Nodes.

The *Eclipſe* of the *Sun* is occaſioned by the Interpoſition of the *Moon* between the *Sun* and the *Earth*. And it is always very near their true Conjunction, or the new *Moon*, as was before obſerved concerning the *Eclipſe* of the *Moon*. And as it doth not affect the Body of the *Sun*, and alſo as the *Moon's* Body, which occaſions the Shadow, is much leſs than the Bodies either of the *Sun* or of the Earth; ſo in ſome Places the *Eclipſe* may be total, when in others it will be only partial, and in others not at all, though the *Sun* is viſible above the *Horizon* in all thoſe Places at the ſame Time.

As the annual *Motion* of the *Sun* and *Moon* is from *Eaſt* to *Weſt*, and the *Moon* moves ſwifter than the *Sun*; ſo in an *Eclipſe*, when the *Moon* overtakes the *Sun*, the *Eclipſe* of the *Sun* begins at the *Weſt* Side, or toward the right Hand, and ends in the oppoſite Side. And for the ſame Reaſon, when the *Moon* begins to enter into the Shadow of the Earth, the *Eclipſe* begins on the *Eaſt* Side, or toward the left Hand, and ends in the oppoſite Side.

And as the apparent *Diſk*, or viſible Breadth of the *Sun*, and alſo of the *Moon* is either greater or leſs according to their nearer Approaches to their reſpective *Perigæum* or *Apogæum*, inſomuch that the apparent *Semidiameter* of the *Sun* is ſometimes 16^{m} $23^{s}\frac{1}{2}$, and at other Times only 15^{m} 50^{s}, and the apparent *Semidiameter* of the *Moon* is ſometimes 16^{m} 52^{s}, and at other Times may be only 15^{m} 50^{s}; ſo ſometimes the *Sun* may not be totally eclipſed, but there may happen to be only a Ring of Light round the dark Body of the *Moon*, and at other Times the Breadth of the Shadow may not be above a Mile, and at another Time 150 Miles, and conſequently the Duration of total Darkneſs may be either leſs or greater.

The Shadow of the *Eclipſe* of the *Sun* is about four Hours in paſſing over the whole Globe of the *Earth*. It begins at the oppoſite Point to that, where the *Sun* appears to riſe, or Weſtward, and ends Eaſtward at the oppoſite Point to that, where the *Sun* appears to ſet. If the *Latitude* of the *Moon* is *Northward*, the Motion of the Shadow is toward the *North*. If the *Latitude* of the *Moon* is *Southward*, the Motion of the Shadow is toward the *South*, and in both Caſes either more or leſs according to the greater or leſs *Latitude* of the *Moon* at the ſame Time. The Shadow moves in an *Elliptick Line*, and throughout the whole Motion in a *Perpendicular* falling upon the *Azimuth* of the *Sun*. Thus, if the *Sun* is exactly in the *Eaſt*, the Motion of the *Center* of the *Eclipſe* is exactly from the *South* to the *North*. If the *Sun* is exactly in the *Weſt*, the Motion of the *Center* is exactly from *North* to *South*. If the *Sun* is exactly in the *South*, its Motion is exactly from *Weſt* to *Eaſt*; and if the *Sun* is exactly in the *South-Eaſt*, the Motion of the *Center* of the *Eclipſe* is exactly *North-Weſt*, &c.

It may ſo happen, that the *Sun* may be eclipſed upon the *Equinoctial Line*, when the *Moon* hath no *Latitude* at all, in which Caſe the Shadow will paſs in a *ſtraight Line* along the *Equinoctial* from *Weſt* to *Eaſt*; and the greater the *Moon's Latitude* is, the greater is the *Elliptick* accordingly toward the *North* or *South*; and the leſſer the *Latitude* is, the nearer is the Approach of the Motion of the Shadow to a ſtraight Line toward the *Eaſt* and from the *Weſt*.

I think, that it would be very agreeable to the Students of *Aſtronomy*, if ſome ſkilful Artiſt would give us exact Rules, whereby to calculate the *Motion* of the *Center* of the *Eclipſe* during its *Viſibility*. And alſo how to draw *Lines* nearly parallel to determine the Breadth of total Darkneſs, and alſo the Diſtances, where the *Sun* is eclipſed either 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, or one *Digit*, both *Northward* or *Southward*, or not at all, if it hath not been done already.

When the *Latitude* of the *Moon* is leſs than her *apparent Semidiameter* ſubſtracted from her *Horizontal Parallax*, or when ſhe doth not much exceed ſix *De-*

grees from her *Node*, her *Eclipſe* will be total. But when her *Latitude* exceeds the *Semidiameter* of her *Horizontal Parallax* added to her own *Diameter*, there can be no *Eclipſe* at all. And the ſame may nearly be ſaid concerning the *Eclipſes* of the *Sun*. So that the *Eclipſes* are either greater or leſs, according to the *Moon's* nearer Approach to, or Diſtance from her *Node*. If the *Latitude* of the *Moon* is Northward, which is, when ſhe is paſſing from the *Dragon's Head* or ☊, or approaching to the *Dragon's Tail* or ☋, and the *Eclipſe* is partial, the Northern Part of the *Moon's* Body only will be darkened. But if the *Latitude* of the *Moon* is Southward, (which is, when ſhe is paſſing from the *Dragon's Tail*, or ☋, or approaching to the *Dragon's Head* or ☊, and the *Eclipſe* is partial, the Southern Part of the *Moon's* Body only will be darkened. And hence we ſee the Reaſon, why the Eclipſes do not happen at every *Full* and *Change*, but only at about two particular Times of the Year. And alſo why in any particular Place of the Earth the viſible *Eclipſes* of the *Sun* are much fewer than the viſible *Eclipſes* of the *Moon*, *viz.* becauſe the *Diameter* of the *Moon*, whoſe Shadow cauſes the *Eclipſe* of the *Sun*, is much leſs than her *Horizontal Parallax*, which Shadow cauſes the *Eclipſe* of the *Moon*.

It may alſo be obſerved, that *(a)* though in any particular Place the *Solar Eclipſes* are much fewer than thoſe of the *Moon*; yet if we reckon throughout the whole World, they are much more in a great Number of Years computed together. The Reaſon is, becauſe

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(a) Mr. Leadbetter *in his laborious and ingenious* Calculation *of* Eclipſes *for* 46 *Years, beginning in the Year* 1714, *and ending in the Year* 1749, *hath made it appear, that in that Space of Time there hath been, and will be* 139 Eclipſes *in all, namely* 85 *of the* Sun, *and* 54 *of the* Moon. *In which Space of Time it ſometimes happens, that in ſome Years there is no* Eclipſe *of the* Moon; *but there is always one or more* Eclipſes *of the* Sun. *And ſometimes it alſo happens, that there are four* Eclipſes *of the* Sun *in one Year; but there are never ſo many* Eclipſes *of the* Moon *in any Year, excepting the Years when the* Moon *paſſes three Times through the* Nodes *in any particular Year.*

as the *Earth* may be ſhadowed in any Place; ſo the whole Shadow of *Solar Eclipſes* is equal to the Diſk of the *Earth*. But as the *Sun*, which cauſes the Shadow, that eclipſes the *Moon*, is much greater than the *Earth*; ſo the Shadow, as it goes from the *Earth*, grows leſs and leſs, and is much leſſer at the *Orb* of the *Moon*, than as it is at the *Earth*, and conſequently the *Eclipſes* of the *Moon* muſt be fewer than thoſe of the *Sun*. And accordingly there can be no *Eclipſe* of the *Moon*, if at the Time of her *Full* ſhe is diſtant from the *Node* above 15^{d} 12^{m}; but there may be an *Eclipſe* of the *Sun* in ſome Part of the World or other, if the *Moon* at her *Change* is diſtant from the *Node* leſs than 18^{d} 7^{m}.

And though the following *Tables* may nearly determine the *Eclipſes* of the *Moon*, yet they do not determine the *Eclipſes* of the *Sun* in any particular Place; but only in general, that there may be an *Eclipſe* of the *Sun* in ſome Part of the World or other.

The *Sun* goes through the *twelve Signs* in a *direct* Motion in about the Space of a Year; but the *Nodes* go round the *twelve Signs* in a *retrograde* Motion in or about the Space of 18 Years and 164 Days; ſo that the *Dragon's Head* or ☊ doth meet the *Sun* by contrary Motions in about the Space of 93 *Julian Years*, as it may be ſeen by the following *Calculation*.

	s.	d.	m.	s.
The *Middle Motion* of the *Sun direct* for 80 Years is	0	0	36	16
For 13 Years is	11	29	51	6
For 6 Hours is	0	0	14	47
Total is	0	0	42	9
The *Middle Motion* of ☊ *retrograde* for 80 Years is	3	17	21	2
For 13 Years is	8	11	25	52
For 6 Hours is	0	0	0	48
Total is	11	28	47	42
The Difference is	0	1	54	27

In which the *Sun* hath exceeded the Place of ☊, and which reduced into Time is $1^d\ 20^h\ 5^m\ 0^s$, which appears from the following *Calculation*.

	s.	d.	m.	s.	
Sun's Middle Motion for one Day is	0	0	59	8	
Hours 20 is	0	0	49	17	
Minutes 5 is	0	0	0	12	
Total is	0	1	48	37	
☊'s *Middle Motion* for one Day is	0	0	3	11	
Hours 20 is	0	0	2	39	
Minutes 5 is	0	0	0	0	
Total is	0	0	5	50	
Total of both is	0	1	54	27	the ſame with the other.

	y.	d.	h.	m.
So that from 93 *Julian Years*, or	93	0	6	0
I ſubſtract the aforeſaid Number	0	1	20	5
And the Remainder is — —	92	363	9	55

Or the *Cycle* of the *Revolution* of ☉ and ☊.

To calculate this with the utmoſt Exactneſs I might take any large Number of *Years*; but I pitch upon the Sum of 93 Years multiplied by 60, or 5580 *Years*, at the End whereof according to the former *Calculation*, if one *Revolution* in 93 Years makes a Difference of $1^d\ 20^h\ 5^m$, then 60 *Revolutions* or 5580 *Years* make a Difference of $110^d\ 5^h$, and which I find to anſwer with the utmoſt Exactneſs, as it appears from the *Tables* of the *Middle Motion* of ☉ and ☊, thus,

Middle Motion of ☉.

	s.	d.	m.	s.
Years 5000 ——	1	7	47	6
Years 500 ——	0	3	46	42
Years 80 ——	0	0	36	16
Total ——	1	12	10	4
Motion of ☊ —	9	17	41	19
Difference of both	3	24	28	45

Middle Motion of ☊.

	s.	d.	m.	s.
Years 5000	7	19	23	54
Years 500	10	10	56	23
Years 80	3	17	21	2
Total —	9	17	41	19

Middle

Middle Motion of ☉.	s.	d.	m.	s.
Days 110 or *April* 20	3	18	25	16
Hours 5 ——	0	0	12	19
Total is ——	3	18	37	35
Motion of ☊ ——	0	5	50	10
Total of both —	3	24	27	45

Middle Motion of ☊.	s.	d.	m.	s.
Days 110 or *April* 20	0	5	49	30
Hours 5 ——	0	0	0	40
Total is ——	0	5	50	10

Which differs but a *Minute* in the *Ecliptick*, or 25 *Minutes* of Time in the Space of 5580 Years, and which Difference is ſo ſmall, that it is not worth the minding. So that from hence I make a *Table* of the *Revolution* of ☉ and ☊ for 60 in Number, or 5580 Years, or *Table* V.

The next Thing is to take the Diſtance of the *Sun's Place* at the End of each *Revolution* from his Diſtance at the Beginning of the ſame. To do this I make the following *Calculation* of the Diſtance of Time from the *Table* of the *Sun's Middle Motion*; thus, as before,

Middle Motion of ☉.	s.	d.	m.	s.
Day 1 ——	0	0	59	8
Hours 20 ——	0	0	49	17
Minutes 5 —	0	0	0	12
Seconds 25 —	0	0	0	1
Total is ——	0	1	48	38

But becauſe the *Sun* in that Space of Time moves forward according to the Succeſſion of the twelve *Signs*, I alſo take an Account of the ſame; thus,

	s.	d.	m.	s.
Years 80 ——	0	0	36	16
Years 13 ——	11	29	51	6
Hours 6 ——	0	0	14	47
Total is ——	0	0	42	9

Which I accordingly ſubſtract from the aforeſaid Sum, and the Remainder is 1^{d} 6^{m} 29^{s}, the Diſtance required.

For the Proof of the Work, and to calculate the ſame with the greater Exactneſs, I ſhall take the ſame Number of 60 *Revolutions* or 5580 Years for that Purpoſe. Now if one *Revolution* makes 1^{d} 6^{m} 29^{s}, then 60 ſhall make 2^{s} 6^{d} 29^{m} 0^{s}. And if the Time given for one *Revolution* is 1^{d} 20^{h} 5^{m}, then the Diſtance required for 60 *Revolutions* is 110^{d} 5^{h}, and the Work ſtands thus,

	s.	d.	m.	s.
Days 110, or *April* 20	3	18	25	16
Hours 5 — —	0	0	12	19
Total is — —	3	18	37	35
Sun's Motion ſubſtract	1	12	8	4
Remainder is ——	2	6	29	31

Sun's Motion in	s.	d.	m.	s.
5000 Years is	1	7	45	6
500 Years is	0	3	46	42
80 Years is	0	0	36	16
Total is —	1	12	8	4

Which as it exceeds the former only 31 Seconds in 60 *Revolutions* or 5580 Years, cannot be made more exact. So that from hence I make a *Table* for the *Sun's* Place at the End of each of theſe 60 *Revolutions*, or *Table* V.

The next Thing is to find the *Middle Motion* of the *Sun* from one *Conjunction* of ☊ to another, which I find to want 18^{d} 9^{h} 8^{m} in a *Common Year*, and 19^{d} 9 8^{m} in a *Biſſextile Year*. The Proof whereof is this,

Middle Motion of ⊙.	s.	d.	m.	s.
For 18 Days	0	17	44	30
For 9 Hours	0	0	22	11
For 8 Minutes	0	0	0	19
Total is —	0	18	7	0
☊'s Motion is	0	0	58	24
Total is —	0	19	5	24

Middle Motion of ☊.	s.	d.	m.	s.
For 18 Days	0	0	57	11
For 9 Hours is	0	0	1	12
For 8 Minutes is	0	0	0	1
Total is ——	0	0	58	24

	s.	d.	m.	s.	
Middle Motion of ⊙ for a Year is	11	29	45	40	
Middle Motion of ☊ for a Year is	0	19	19	44	
Total of both is	0	19	5	24	the ſame with the other.

The half of the Time mentioned is $9^d\ 4^h\ 34^m$, or the Difference leſs than half a Year, in the Space between the ☌ ☉ ☊, and ☌ ☉ ☋.

The next Thing in Uſe in theſe *Calculations* is a *Table* or *Calendar* for the Days of each *Month* collectively in one *Year*, be it either *Common* or *Biſſextile.* But this is done already in *Table* III.

The next Thing to be performed is to make a *Calendar* of the twelve *Months* in the *Year*, which I divide into nine *Columns*, as *Table* VII. The firſt *Column* I leave as a Blank, wherein to inſert the *Ecliptick Number*. The ſecond I fill up with the Days of the *Month*. The third and fourth I make Uſe of for the *Vulgar Years* after *Chriſt's Nativity*. The fifth *Column* ſerves for the *Vulgar Year* of *Chriſt* 00. The ſixth and ſeventh *Columns* ſerve for the *Vulgar Years* before *Chriſt's Nativity* The eighth *Column* I fill up with the Days of the *Month*, as *Col.* 2. And the laſt hath the *Ecliptick Number* for the Years before *Chriſt's Nativity*, as the firſt had for the *Years* after it. In the third and ſixth of theſe I put the Time, when the *Sun* according to its *Middle Motion* comes to the *Coujunction* of ☊ or ☋; and the fourth and ſeventh *Columns* ſhew the *Sun's* Place in the *Ecliptick Line* according to its *Middle Motion* at the ſame Time.

Accordingly I begin to calculate from the *Vulgar Year* of *Chriſt* 1; and I find, that there is a *Conjunction* of the *Sun* and ☊ on *December* $3^d\ 16^h\ 22^m$. The Proof whereof is as follows,

☉'s Middle Motion.

	s.	d.	m.	s.
Anno Chriſti 1	9	7	53	3
December 3 —	11	2	9	47
Hours 16 —	0	0	39	25
Minutes 22 —	0	0	0	53
Total is ——	8	10	43	8

☊'s Middle Motion.

	s.	d.	m.	s.
Anno Chriſti 1	8	28	36	4
December 3 —	0	17	50	46
Hours 16 ——	0	0	2	7
Minutes 22 —	0	0	0	3
Total is ——	0	17	52	56
Remains ——	8	10	43	8

And as they both agree, ſo accordingly in the firſt *Column* before *December* 3 I place the Number 1; in the third *Column* over-againſt it I place the Time of the *Middle Conjunction* thus, ☊ 16^h 22^m 0^s, ſo alſo in the fourth *Column* I put ♐ 10^h 43^m 8^s for the *Sun's* Place.

This being done I endeavour to find out the *Middle Conjunction* of the *Sun* and ☋ in the ſame Year, thus,

	d.	h.	m.
From half a Year, or —	182	12	0
Subſtract the Deficiency of	9	4	34
The Remainder is ——	137	7	26
From *December* 3, or —	337	16	22
Subſtract — — —	173	7	26
The Remainder is ——	164	8	56

Or as from *Table* III. of the collected Days in a *Common Year*, June 13^d 8^h 56^m. The Proof whereof is thus,

Middle Motion of ⊙.

	s.	d.	m.	s.
Anno Chriſti 1	9	7	53	3
June 13, or 164	5	11	38	46
Hours 8 —	0	0	19	43
Minutes 56 —	0	0	2	18
⊙'s Place —	2	19	53	50

Middle Motion of ☊.

	s.	d.	m.	s.
Anno Chriſti 1	8	28	36	4
June 13, or 164	0	8	41	5
Hours 8 ——	0	0	1	4
Minutes 56 —	0	0	0	7
Subſtract —	0	8	42	16
Remains ☊'s Place	8	19	53	48
The Oppoſite or ☋'s Place	2	19	53	48

And becauſe it anſwers ſo nearly, I place the *Number* 1 in the firſt *Column* before *June* 13; and in the third and fourth *Column* I place ☋ 3 56 for the Time of the *Conjunction*, and ♊ 19 53 50 for the *Sun's* Place at that Time.

The next Thing is to find out the *Conjunction* of the ☉ and ☊ in the next *Year*, or the ſecond *Year* after *Chriſt's Nativity*; which I do thus,

	d.	h.	m.	
From December 3, or —	327	16	22	as before.
Subſtract the annual *Revolution* of the ☌ ☉ ☊	18	9	8	
The Remainder is *Nov.* 15, or	309	7	14	the Time of ☌ ☉ ☊ in the next Year.

The Proof is thus,

☉'s Middle Motion.	s.	d.	m.	s.
Anno Chriſti 1	9	7	53	3
Years 1 ——	11	29	45	40
November 15	10	14	25	17
Hours 7 —	0	0	17	15
Minutes 14 —	0	0	0	35
☉'s Place, Total	7	22	21	50

☊'s Middle Motion.	s.	d.	m.	s.
Anno Chriſti 1	8	28	36	4
Anno 1 ——	0	19	19	43
November 15	0	16	53	34
Hours 7 —	0	0	0	56
Minutes 14 —	0	0	0	1
Subſtract —	1	6	14	14
☊'s Place, Rem.	7	22	21	50

And becauſe it anſwers ſo exactly, I place the *Number* 2 in the firſt *Column* over-againſt *Nov.* 15; in the third *Column* I place ☊ 7 14 for the Time of the *Conjunction*, and in the fourth *Column* I put ♏ 22 21 50 for the *Sun's* Place at that Time.

The other *Calculations* are performed after the ſame Manner.

But here it muſt be obſerved, that the *Middle Place* of the *Sun* and its real Place is never exactly the ſame, but when the *Sun* is exactly upon the Point of its *Apogæum* or *Perigæum*. They agree pretty nearly in *Summer* and *Winter*, or in the *Months* of *June* and *December*, and they differ moſt in the *Spring* and *Fall*, or in the *Months* of *March* and *September*, eſpecially in this preſent Age. The greateſt *Equation* is 1^d 56^m 20^s, and ſo far may be the Diſtance of the *Sun's*

Place in the *Calendar* from the neareſt *Node*, when there is no Difference in its *Middle Diſtance.* This reduced into Time is 1^{d} 23^{h} 13^{m}, and ſo long Space of Time may the *Sun* ſometimes require, either before he comes to the neareſt *Node*, as in the *Fall*, or after it, as in the *Spring*. So that he who deſires to be more exact, muſt calculate the ſame, as uſual, by the *Rules* and *Tables* of *Aſtronomy*.

But to prevent any Miſtake, which may happen by the intervening of the additional Day in the *Biſſextile* or *Leap Year*, theſe following Directions muſt be obſerved.

If the Year required, in which any *Eclipſe* is ſought for, is a *Biſſextile* or *Leap Year*, and after the Diviſion by 93, as aforeſaid, the Remainder is 4, 8, 12, 16, 20, *&c.* it ſerves without any Alteration.

If it is a *Biſſextile*, and the Remainder is any other Number, which cannot be equally divided by 4, a Day muſt be added until the 28th Day of *February*.

But if it be not a *Leap Year*, let the Sum in the Remainder, or the *Ecliptick Number* be divided by 4; and then each of theſe Numbers of *Years* I call *A Quaternion*. And then if the *Biſſextile* or *Leap Year* happens to be before the *Year* ſought for in the ſaid *Quaternion*, there muſt one Day be added to the Day of the Month throughout the whole *Year*. If the ſaid *Year* is the laſt Number in the *Quaternion*, there muſt one Day be added until the firſt Day of *March* and no longer. But if the *Biſſextile* is after the *Year* required in the ſaid *Quaternion*, the *Year* ſtands without any Alteration.

If the *Year* either before or after *Chriſt's Nativity* being divided by 93 there is no Remainder, the *Ecliptick Number* is 93, in which Caſe the *Quotient* in the Diviſion muſt be reckoned as one leſs than it really is.

And as the *Change* of the *Moon* may be found out by the *Number* 19, and the *Eclipſes* by the *Number* 93; ſo the *Apogæum* of the *Moon* may be known by

the

the *Number* 115, in which Space of Time it makes 13 *Revolutions*, and varies from her firſt Point only $26^{m}\ 3^{s}$, as it appears from the following *Computation.*

		s.	d.	m.	s.
Apog. for Years 100	——	3	19	11	15
Years 15	——	8	10	17	41
Hours 18	——	0	0	5	1
Total is		11	29	33	57
Complement to a Circle		0	0	26	3

But I ſhall omit this, as not knowing of what Uſe it can be in *Aſtronomy.*

The Uſe of *Table* V. VI. and VII. is this: If you would know the *Eclipſes* in any Year given, either before or after the *Year* of *Chriſt's Nativity*, divide the ſaid *Year* by 93, the *Quotient* ſhews the Number of the *Ecliptick Revolutions*; and the Remainder ſhews the *Ecliptick Number.* Look into the *Calendar* or *Table* VII. and take from the *Table* of the *Ecliptick Revolutions* or *Table* V. the Sum appointed for the *Number* which you muſt ſubſtract from the other, if it is the *Year* after *Chriſt's Nativity*, or add to it, if it is the *Year* before it, and the Product will ſhew the Place of the *Node* at that Time near which the *Eclipſes* either did, or ſhall happen.

Then take the *Sun's Place* from *Column* 4 or 7 in the *Calendar* or *Table* VII. by the Help of the *Ecliptick Number* as before, and the Difference according to Number of *Revolutions* in *Table* VI. which add to the *Sun's* Place, if it is in any *Year* after *Chriſt's Nativity*; or ſubſtract from the ſame, if it is any *Year* before it, and the Product is the *Sun's Place* at that Time.

Then take the *Sun's* Diſtance from the *Node*, and accordingly by the preceding Rules you will be able nearly to judge, whether there will be an *Eclipſe* or

Eclipſes of the *Sun* at that Time, and alſo whether at that Time there will be an *Eclipſe* or *Eclipſes* of the *Moon*; and whether the *Eclipſe* or *Eclipſes* of the *Moon* will be either *total* or *partial*, and if partial, whether the *North* or *South* Part of the *Moon's* Body will be darkened; all which may be nearly gueſſed at from the preceding Rules.

CHAP. III.

Of the FRACTIONS *of the* SQUARE *and* CUBE ROOTS.

WINGATE in his *Arithmetick* (which I take to be the beſt Book that hath been yet wrote on that Subject) tells us, *Book* I. *Chap*. 32. *Sect*. 16. that *no Rules of Art hitherto known will exactly diſcover the Fraction of a Square, although we may proceed infinitely near it*; for which he gives us a Rule in the next *Section*. And *Chap*. 33. *Sect*. 25. he ſaith the ſame concerning the *Fraction* of a *Cube Root*.

In Anſwer to this it muſt be allowed, that there is no Rule, which will exactly take the *Decimal Fraction* of either, which is the Method, that he propoſes; but yet a Rule may be given to take their *Vulgar Fraction* by a *Mathematical Exactneſs*, which he hath omitted.

And firſt concerning the *Square Root*. It appears from *Euclid*, *Book* II. *Prob*. 4. that if a *Square Root* is

10
10

100

11
11

11
11

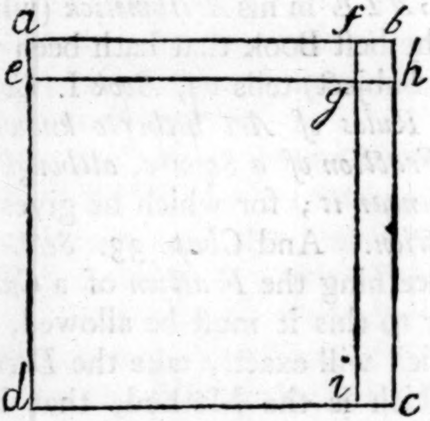
121

100
10
10
1

121

is increaſed by the *Addition* of an *Unite* to the *Root*, the *Square* of the latter will exceed the *Square* of the former by the *Addition* of twice the Length of the firſt *Root* and an *Unite*. Thus in FIG. I. Let the *Root* of the *Square* (*e g d i*) be any given Number. I ſuppoſe it to be 10. And let the Addition to it be an Unite more, ſo as to make the *Square* (*a b c d*). This Addition makes the *Square* of 11, and conſiſts of the *Oblong* (*a e f g*) or 10, and the other *Oblong* (*g b c i*) or 10 more, and the *Unite* (*f b g h*) which added together make 21 in the whole, and is the Difference between the leſſer *Square* (*e d g i*) and the greater *Square* (*a b c d*), as it appears in the *Margin*. So that I take 21 for a *Denominator*, and the *Remainder* for a *Numerator*, and the Work is finiſhed. Thus for Example, the *Square Root* of 112 will be $10\frac{12}{21}$.

FIGURE I.

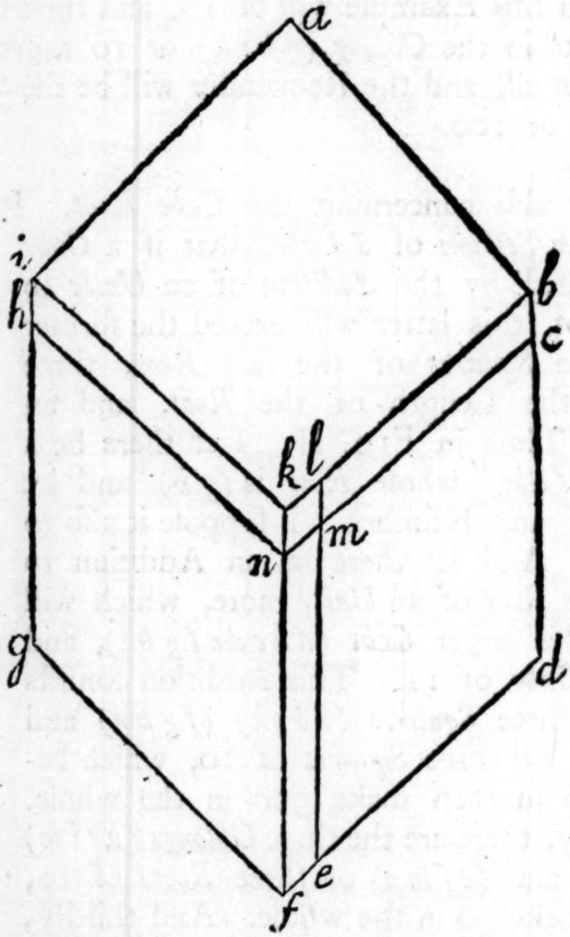


This may alſo be ſubject to an ocular Demonſtration, by taking any Number of Dice, which are ſquare, or of Bricks, ſuppoſing them to be ſquare, and placing them in a ſquare Order. And if from thence you take away the ſingle Die or Brick *(f b g h)*, and then the Dice or Bricks in the *Oblong (a f e g)*, which in this Example will be 10, and then the Dice or Bricks in the *Oblong (g h i k)* or 10 more, which are 21 in all, and the Remainder will be the *Square* of *(e g d i)* or 100.

Thus alſo concerning the *Cube Root*. It appears from the *Section* of a *Cube*, that if a *Cube* is increaſed by the *Addition* of an *Unite* to the Root, this latter will exceed the former by three *Squares* of the ſaid *Root*, three Times the Length of the *Root*, and an *Unite*. Thus in FIG. II. Let there be a ſmaller *Cube*, whoſe *Root* is *(g h)*, and let it be of any Number. I ſuppoſe it alſo to be 10. And let there be an Addition to the *Cube Root* of an *Unite* more, which will make the larger *Cube (a b c d e f g h i)*, and is the *Cube* of 11. This Addition conſiſts of the three *Squares (a b i k) (f g h n)* and *(c d e m)* or three *Squares* of 10, which being 100 in each make 300 in the whole. Secondly, there are the three *Oblongs (b c l m) (h i k n)* and *(e f m n)* or three *Roots* of 10, which make 30 in the whole. And thirdly, there is the *Unite (k l m n)*, all which added together make 331, and is the Difference between the leſſer *Cube* of 10, and the greater *Cube (a b c d e f g h i)* or the *Cube* of 11. So that I take 331 for a *Denominator*, and the *Remainder* for a *Numerator*, and the Work is alſo finiſhed. Thus the *Cube* of 10 is 1000, and the *Cube* of 11 is 1331, as in the Margin. The Difference between them is 331, and the *Cube* of 1234 will be $10\frac{234}{331}$.

10 10
100 10
1000
11 11
11 11
121 11
121 121
1331
10 10
300 10
3
30
300 30 1
331 1000
1331

FIGURE II.



This may alſo be farther ſubject to an ocular Demonſtration, by taking any Number of Dice, which are exact *Cubes*, or of Bricks, ſuppoſing them to be *Cubes*, of any Number, and placing them in as exact a Cube as poſſible, as *(a b c d e f g h i)*; and if from thence you take away the ſingle Dice or Brick *(k l m n)* and afterward the three *Oblongs (b c l m) (e f n m)* and *(h i k n)*, and afterward take away the three *Squares (a b i k) (c d e m)* and *(f g h n)*, which are the *Squares* of the *Root (g h)*, the *Remainder* will be the *Cube* of the *Root (g h)*, or of an *Unite* leſs.

TABLE I.

A Table of the Revolutions of the *Lunar Cycle* to be ſubſtracted from the *New Moon* in the Calendar for the Years after *Chriſt*, and added to it for the *Years* before *Chriſt's Nativity*.

Revolutions.	d.	h.	m.	s.
1	0	1	28	8
2	0	2	56	16
3	0	4	24	24
4	0	5	52	31
5	0	7	20	39
6	0	8	48	47
7	0	10	16	55
8	0	11	45	3
9	0	13	13	11
10	0	14	41	18
11	0	16	9	26
12	0	17	37	34
13	0	19	5	42
14	0	20	33	50
15	0	22	1	58
16	0	23	30	6
17	1	0	58	13
18	1	2	26	21
19	1	3	54	29
20	1	5	22	37
40	2	10	45	14
60	3	16	7	51
80	4	21	30	28
100	6	2	53	5
200	12	5	46	10
300	18	8	39	15
312	19	2	16	50

TABLE II.

A Table of the *Solar Revolutions* to be added to the *Sun's* Place in the *Calendar* for the Years after *Chriſt*, and ſubſtracted from it for the Years before *Chriſt's Nativity*.

Revolutions.	s.	d.	m.	s.
1	0	0	8	36
2	0	0	17	13
3	0	0	25	50
4	0	0	34	27
5	0	0	43	4
6	0	0	51	41
7	0	1	0	18
8	0	1	8	54
9	0	1	17	32
10	0	1	26	8
11	0	1	34	45
12	0	1	43	22
13	0	1	51	59
14	0	2	0	36
15	0	2	9	13
16	0	2	17	49
17	0	2	26	27
18	0	2	35	4
19	0	2	43	41
20	0	2	52	17
40	0	5	44	35
60	0	8	36	53
80	0	11	29	11
100	0	14	21	29
200	0	28	42	59
300	1	13	4	29
312	1	14	47	51

January			February			March			April		
Days	Common Years	Biſſextile	Days	Common Years	Biſſextile	Days	Common Years	Biſſextile	Days	Common Years	Biſſextile
1	1	1	1	32	32	1	60	61	1	91	92
2	2	2	2	33	33	2	61	62	2	92	93
3	3	3	3	34	34	3	62	63	3	93	94
4	4	4	4	35	35	4	63	64	4	94	95
5	5	5	5	36	36	5	64	55	5	95	96
6	6	6	6	37	37	6	65	66	6	96	97
7	7	7	7	38	38	7	66	67	7	97	98
8	8	8	8	39	39	8	67	68	8	98	99
9	9	9	9	40	40	9	68	69	9	99	100
10	10	10	10	41	41	10	69	70	10	100	101
11	11	11	11	42	42	11	70	71	11	101	102
12	12	12	12	43	43	12	71	72	12	102	103
13	13	13	13	44	44	13	72	73	13	103	104
14	14	14	14	45	45	14	73	74	14	104	105
15	15	15	15	46	46	15	74	75	15	105	106
16	16	16	16	47	47	16	75	76	16	106	107
17	17	17	17	48	48	17	76	77	17	107	108
18	18	18	18	49	49	18	77	78	18	108	109
19	19	19	19	50	50	19	78	79	19	109	110
20	20	20	20	51	51	20	79	80	20	110	111
21	21	21	21	52	52	21	80	81	21	111	112
22	22	22	22	53	53	22	81	82	22	112	113
23	23	23	23	54	54	23	82	83	23	113	114
24	24	24	24	55	55	24	83	84	24	114	115
25	25	25	25	56	56	25	84	85	25	115	116
26	26	26	26	57	57	26	85	86	26	116	117
27	27	27	27	58	58	27	86	87	27	117	118
28	28	28	28	59	59	28	87	88	28	118	119
29	29	29	29		60	29	88	89	29	119	120
30	30	30				30	89	90	30	120	121
31	31	31				31	90	91			

May			June			July			Auguſt		
Days	Common Years	Biſſextile	Days	Common Years	Biſſextile	Days	Common Years	Biſſextile	Days	Common Years	Biſſextile
1	121	122	1	152	153	1	182	183	1	213	214
2	122	123	2	153	154	2	183	184	2	214	215
3	123	124	3	154	155	3	184	185	3	215	216
4	124	125	4	155	156	4	185	186	4	216	217
5	125	126	5	156	157	5	186	187	5	217	218
6	126	127	6	157	158	6	187	188	6	218	219
7	127	128	7	158	159	7	188	189	7	219	220
8	128	129	8	159	160	8	189	190	8	220	221
9	129	130	9	160	161	9	190	191	9	221	222
10	130	131	10	161	162	10	191	192	10	222	223
11	131	132	11	162	163	11	192	193	11	223	224
12	132	133	12	163	164	12	193	194	12	224	225
13	133	134	13	164	165	13	194	195	13	225	226
14	134	135	14	165	166	14	195	196	14	226	227
15	135	136	15	166	167	15	196	197	15	227	228
16	136	137	16	167	168	16	197	198	16	228	229
17	137	138	17	168	169	17	198	199	17	229	230
18	138	139	18	169	170	18	199	200	18	230	231
19	139	140	19	170	171	19	200	201	19	231	232
20	140	141	20	171	172	20	201	202	20	232	233
21	141	142	21	172	173	21	202	203	21	233	234
22	142	143	22	173	174	22	203	204	22	234	235
23	143	144	23	174	175	23	204	205	23	235	236
24	144	145	24	175	176	24	205	206	24	236	237
25	145	146	25	176	177	25	206	207	25	237	238
26	146	147	26	177	178	26	207	208	26	238	239
27	147	148	27	178	179	27	208	209	27	239	240
28	148	149	28	179	180	28	209	210	28	240	241
29	149	150	29	180	181	29	210	211	29	241	242
30	150	151	30	181	182	30	211	212	30	242	243
31	151	152				31	212	213	31	243	244

September			October			November			December		
Days	Common Years	Biſſextile	Days	Common Years	Biſſextile	Days	Common Years	Biſſextile	Days	Common Years	Biſſextile
1	244	245	1	274	275	1	305	306	1	335	336
2	245	246	2	275	276	2	306	307	2	336	337
3	246	247	3	276	277	3	307	308	3	337	338
4	247	248	4	277	278	4	308	309	4	338	339
5	248	249	5	278	279	5	309	310	5	339	340
6	249	250	6	279	280	6	310	311	6	340	341
7	250	251	7	280	281	7	311	312	7	341	342
8	251	252	8	281	282	8	312	313	8	342	343
9	252	253	9	282	283	9	313	314	9	343	344
10	253	254	10	283	284	10	314	315	10	344	345
11	254	255	11	284	285	11	315	316	11	345	346
12	255	256	12	285	286	12	316	317	12	346	347
13	256	257	13	286	287	13	317	318	13	347	348
14	257	258	14	287	288	14	318	319	14	348	349
15	258	259	15	288	289	15	319	320	15	349	350
16	259	260	16	289	290	16	320	321	16	350	351
17	260	261	17	290	291	17	321	322	17	351	352
18	261	262	18	291	292	18	322	323	18	352	353
19	262	263	19	292	293	29	323	324	19	353	354
20	263	264	20	293	294	20	324	325	20	354	355
21	264	265	21	294	295	21	325	326	21	355	356
22	265	266	22	295	296	22	326	327	22	356	357
23	266	267	23	296	297	23	327	328	23	357	358
24	267	268	24	297	298	24	328	329	24	358	359
25	268	269	25	298	299	25	329	330	25	359	360
26	269	270	26	299	300	26	330	331	26	360	361
27	270	271	27	300	301	27	331	332	27	361	362
28	271	272	28	301	302	28	332	333	28	362	363
29	272	273	29	302	303	29	333	334	29	363	364
30	273	274	30	303	304	30	334	335	30	364	365
			31	304	305				31	365	366

TABLE IV.

The LUNAR TABLE *for* January.

Golden Number	Days	Years before Chriſt. ☌ ☉ ☽ ſubſtract.			Years after Chriſt. ☉'s Place add.				Year of Chriſt oo.	Years before Chriſt ☌ ☉ ☽ add.			Years before Chriſt. ☉'s Place ſubſtract.				Days	Golden Number
		h.	m.	s	s.	d.	m.	s.		h.	m.	s	s.	d.	m.	s.		
	1																1	
2	2	3	36	38	♑	9	25	53		11	4	44	♑	9	40	53	2	17
10	3	16	17	41	♑	11	19	56		23	45	54	♑	11	14	57	3	9
	4																4	
18	5	4	58	38	♑	12	53	55		12	24	48	♑	12	47	53	5	1
	6																6	
7	7	1	7	49	♑	14	22	56		8	35	44	♑	14	17	55	7	12
15	8	13	48	43	♑	15	56	57		21	16	53	♑	15	52	0	8	4
	9									17	26	3	♑	17	21	1	9	15
4	10	9	57	51	♑	17	25	58									10	
12	11	22	33	56	♑	19	0	0		6	7	1	♑	18	55	3	11	7
1	12	18	48	0	♑	20	29	2									12	
	13									2	16	13	♑	20	24	5	13	18
9	14	7	29	3	♑	22	3	2		14	57	12	♑	21	58	6	14	10
17	15	20	10	0	♑	23	37	2									15	
	16									3	38	5	♑	23	32	2	16	2
6	17	16	19	11	♑	25	6	6		23	47	23	♑	25	1	8	17	13
	18																18	
14	19	5	0	8	♑	26	40	6		12	28	21	♑	26	35	11	19	5
	20																20	
3	21	1	9	18	♑	28	9	8	Day 24	8	37	25	♑	28	4	10	21	16
11	22	13	50	18	♑	29	53	9	☌ ☉ ☽	21	18	24	♑	29	38	11	22	8
	23								9 29 24								23	
19	24	2	31	20	♒	1	17	10	☉ in	17	27	36	♒	1	7	14	24	19
8	25	22	40	24	♒	2	46	11	♒ 1 12 12	6	8	34	♒	2	41	14	25	11
	26									18	49	35	♒	4	15	15	26	3
16	27	11	21	22	♒	4	20	11									27	
15	28	7	30	33	♒	5	49	13		14	58	45	♒	5	44	15	28	14
13	29	20	11	37	♒	7	23	16									29	
	30									3	39	43	♒	7	18	9	30	6
2	31	16	20	41	♒	8	53	17		23	48	47	♒	8	47	19	31	17

TABLE IV.

The LUNAR TABLE *for* February.

Golden Number	Days	Years after Chriſt. ☌ ☉ ☽ ſubſtract.			Years after Chriſt. ☉'s Place add.				Year of Chriſt 00.	Years before Chriſt ☌ ☽ ☉ add.			Years before Chriſt. ☉'s Place ſubſtract.				Days	Golden Number
		h.	m.	s.	s.	d.	m.	s.		h.	m.	s.	s.	d.	m.	s.		
	1																1	
10	2	5	1	44	♒	10	26	20		12	17	45	♒	10	21	20	2	9
13	3	17	42	42	♒	12	0	21									3	
	4									1	8	51	♒	11	54	17	4	1
7	5	13	51	52	♒	13	29	20		21	19	47	♒	13	24	19	5	12
	6																6	
15	7	2	32	46	♒	15	3	20		10	0	56	♒	14	58	23	7	4
4	8	22	41	54	♒	16	32	24		6	10	7	♒	16	27	25	8	15
	9																9	
12	10	11	22	59	♒	18	6	23		18	51	5	♒	18	1	26	10	7
1	11	7	32	3	♒	19	35	27									11	
9	12	20	13	6	♒	21	9	28		15	0	16	♒	19	30	30	12	18
	13																13	
17	14	8	54	3	♒	22	43	28		3	41	15	♒	21	4	30	14	10
	15									16	22	9	♒	22	38	29	15	2
6	16	5	3	14	♒	24	12	9		12	31	20	♒	24	7	30	16	13
14	17	17	44	11	♒	25	46	30									17	
	18									1	12	24	♒	25	41	38	18	5
3	19	13	53	21	♒	27	15	33		21	21	28	♒	27	10	32	19	16
	20																20	
11	21	2	34	21	♒	28	49	33	Day 22	10	2	27	♒	28	44	38	21	8
19	22	15	15	23	♓	0	23	36	☌ ☉ ☽	6	11	39	♓	0	13	39	22	19
	23								22 43 25	18	52	37	♓	1	47	38	23	11
8	24	11	24	28	♓	1	52	36	☉ in								24	
15	25	0	5	25	♓	3	26	35	♓ 0 18 35	7	33	38	♓	3	21	39	25	3
5	26	20	14	36	♓	4	55	38									26	
	27									3	42	48	♓	4	50	40	27	14
13	28	8	55	41	♓	6	29	43		16	23	46	♓	6	24	40	28	6
	29																29	

TABLE. IV.

The LUNAR TABLE *for* March.

Golden Number	Days	Years after Chriſt. ☌ ☉ ☽ ſubſtract.			Years after Chriſt. ☉'s Place add				Year of Chriſt oo.	Years before Chriſt. ☌ ☉ ☽ add.			Years before Chriſt. ☉'s Place ſubſtract.				Days	Golden Number
		h.	m.	s.	s.	d.	m.	s.		h.	m.	s.	s.	d.	m.	s.		
	1																1	
2	2	5	4	44	♓	7	58	41		12	32	50	♓	7	53	43	2	17
10	3	17	45	47	♓	9	32	40									3	
	4									1	13	48	♓	9	27	44	4	9
18	5	6	26	45	♓	11	6	44		13	54	52	♓	11	1	45	5	1
	6									10	3	51	♓	12	30	46	6	12
7	7	2	35	55	♓	12	35	45		22	44	59	♓	14	4	46	7	4
15	8	15	16	45	♓	14	9	45									8	
4	9	11	25	58	♓	15	38	47		18	54	10	♓	15	33	49	9	15
	10																10	
12	11	0	7	2	♓	17	12	50		7	35	8	♓	17	7	50	11	7
1	12	20	16	6	♓	18	41	50									12	
	13									3	44	19	♓	18	56	33	13	18
9	14	8	57	9	♓	20	15	51		16	45	18	♓	20	20	52	14	10
17	15	21	38	7	♓	21	49	52									15	
	16									5	6	12	♓	21	44	53	16	2
6	17	17	47	17	♓	23	18	52									17	
	18									1	15	23	♓	23	13	54	18	13
14	19	6	28	14	♓	24	52	54		13	56	27	♓	24	47	57	19	5
	20									10	5	32	♓	26	16	57	20	16
3	21	2	37	7	♓	26	21	56	Day 23	22	46	30	♓	27	51	0	21	8
11	22	15	18	24	♓	27	55	58	☌ ☉ ☽								22	
	23								11 27 28	18	55	42	♓	29	20	3	23	19
19	24	3	59	26	♓	29	29	59	☉ in								24	
8	25	0	8	31	♈	0	58	59	♈ 28 25 51	7	36	40	♈	0	54	2	25	11
16	26	12	49	29	♈	2	33	1		20	17	41	♈	2	28	5	26	3
	27																27	
5	28	8	58	39	♈	4	2	4		16	26	51	♈	3	57	5	28	14
13	29	21	39	44	♈	5	36	8									29	
	30									5	7	49	♈	5	31	7	30	6
2	31	17	48	47	♈	7	5	6									31	

The LUNAR TABLE *for* April.

Golden Number	Days	Years after Chriſt. ☌ ☉ ☽ ſubſtract.			Years after Chriſt. ☉'s Place add.				Year of Chriſt 00.	Years before Chriſt ☌ ☉ ☽ add.			Years before Chriſt. ☉'s Place ſubtract.				Days	Golden Number
		h.	m.	s.	s.	d.	m.	s.		h.	m.	s	s.	d.	m.	s.		
	1									1	16	53	♈	7	0	7	1	17
10	2	6	29	50	♈	8	39	6		13	57	51	♈	8	34	7	2	9
18	3	19	10	48	♈	10	13	9									3	
	4									2	36	57	♈	10	7	6	4	1
7	5	15	19	59	♈	11	42	9		22	47	54	♈	11	37	10	5	12
	6									11	29	3	♈	13	11	12	6	4
15	7	4	0	50	♈	13	16	4									7	
4	8	—	10	1	♈	14	45	11		7	38	13	♈	14	40	13	8	15
12	9	12	51	6	♈	16	19	12		20	19	11	♈	16	14	15	9	7
	10																10	
1	11	9	0	9	♈	17	48	16		16	28	23	♈	17	43	17	11	18
9	12	21	41	12	♈	19	22	16									12	
	13									5	9	21	♈	19	17	19	13	10
17	14	10	22	10	♈	20	56	17		17	50	15	♈	20	51	17	14	2
	15																15	
6	16	6	31	20	♈	22	25	17		13	59	26	♈	22	20	20	16	13
14	17	19	12	17	♈	23	59	19									17	5
	18									2	40	30	♈	23	54	23	18	16
3	19	15	21	11	♈	25	28	20		22	49	35	♈	25	23	22	18	
																	19	
	20									11	30	33	♈	26	57	24	20	8
11	21	4	2	27	♈	27	2	20	Day 22								21	
19	22	16	43	29	♈	28	36	23	☌ ☉ ☽	7	39	45	♈	28	26	26	22	19
8	23	12	52	34	♉	0	5	24	0 11 31	20	20	43	♉	0	0	26	23	11
	24								☉ in								24	
16	25	1	33	32	♉	1	39	24	♉ 28 31 23	9	1	44	♉	1	34	28	25	3
5	26	21	41	42	♉	3	8	28		5	10	54	♉	3	3	28	26	14
	27																27	
13	28	10	23	39	♉	4	42	27		17	51	52	♉	4	37	32	28	6
	29																29	
2	30	6	32	50	♉	6	11	30		14	0	57	♉	6	6	31	30	17

The LUNAR TABLE *for* May.

Golden Number	Days	Years after Chriſt. ☌ ☉ ☽ ſubſtract.			Years after Chriſt. ☉'s Place add				Year of Chriſt oo.	Years before Chriſt. ☌ ☉ ☽ add.			Years before Chriſt. ☉'s Place ſubſtract.				Days	Golden Number
		h.	m.	s.	s.	d.	m.	s.		h.	m.	s.	s.	d.	m.	s.		
10	1	19	13	53	♉	8	39	6									1	
	2									2	41	54	♉	7	40	30	2	9
18	3	17	54	51	♉	9	19	32		15	22	58	♉	9	14	23	3	1
	4									11	31	57	♉	10	43	30	4	12
7	5	4	4	2	♉	10	48	32									5	
15	6	16	44	54	♉	12	22	33		0	13	6	♉	12	17	36	6	4
4	7	12	54	4	♉	13	51	36		20	22	16	♉	13	46	58	7	15
	8																8	
12	9	1	35	9	♉	15	25	38		9	3	14	♉	15	20	38	9	7
1	10	21	44	12	♉	16	54	39									10	
	11									5	12	26	♉	16	49	39	11	18
9	12	10	25	15	♉	19	22	16		17	53	24	♉	18	23	41	12	10
17	13	23	6	13	♉	20	2	42									13	
	14									6	34	18	♉	19	57	41	14	2
6	15	19	15	24	♉	21	31	45									15	
	16									2	43	30	♉	21	26	44	16	13
14	17	7	56	20	♉	23	59	18		15	24	34	♉	23	0	46	17	5
	18									11	33	38	♉	24	29	45	18	16
3	19	4	5	14	♉	24	34	37									19	
11	20	16	46	31	♉	26	8	47		0	14	36	♉	26	3	47	20	8
	21								Day 21 ☌ ☉ ☽ 12 55 34 ☉ in ♉ 27 37 47	20	23	48	♉	27	32	49	21	19
19	22	5	27	33	♉	27	42	49									22	
8	23	1	36	37	♉	29	11	48		9	4	46	♉	29	6	51	23	11
16	24	14	17	35	♊	0	45	49		21	45	47	♊	0	40	50	24	3
	25																25	
5	26	10	26	45	♊	2	14	52		17	54	58	♊	2	9	53	26	14
13	27	23	7	42	♊	3	48	52									27	
	28									6	35	55	♊	3	43	56	28	6
2	29	19	16	54	♊	5	17	54									29	
	30									2	45	0	♊	5	12	55	30	17
10	31	7	57	57	♊	6	51	57		15	25	57	♊	6	46	56	31	9

TABLE IV.

The LUNAR TABLE *for* June.

Golden Number	Days	Years after Christ. ☌ ⊙ ☽ ſubſtract. h.	m.	s.	Years after Christ. ⊙'s Place add. s.	d.	m.	s.	Year of Christ 00.	Years before Christ ☌ ⊙ ☽ add. h.	m.	s.	Years before Christ. ⊙'s Place ſubtract. s.	d.	m.	s.	Days	Golden Number
18	1	20	38	54	♊	8	25	56									1	
	2									4	7	1	♊	8	20	58	2	1
7	3	16	48	5	♊	9	54	57		0	16	0	♊	9	49	59	3	12
	4									12	57	9	♊	11	24	0	4	4
15	5	5	28	57	♊	11	28	57									5	
4	6	1	38	7	♊	12	58	0		9	6	19	♊	12	53	3	6	15
12	7	14	19	12	♊	14	32	2		21	47	17	♊	14	27	4	7	7
	8																8	
1	9	10	28	15	♊	16	1	3		17	56	28	♊	15	56	7	9	18
9	10	23	9	18	♊	17	35	4									10	
	11									6	37	28	♊	17	30	6	11	10
17	12	11	50	16	♊	19	9	5		19	18	21	♊	19	4	4	12	2
	13																13	
6	14	7	59	27	♊	20	38	6		15	27	33	♊	20	33	9	14	13
14	15	20	40	24	♊	22	12	7									15	
	16								Day 20	4	8	37	♊	22	7	10	16	5
3	17	16	49	15	♊	23	41	7	☌ ⊙ ☽	0	17	41	♊	23	36	10	17	16
	18								1 39 37	12	58	39	♊	25	10	12	18	8
11	19	5	30	34	♊	25	15	10	⊙ in								19	
19	20	18	11	36	♊	26	49	12	♊ 26 44 10	9	7	51	♊	26	35	15	20	19
8	21	14	20	40	♊	28	18	12		21	48	59	♊	28	13	15	21	11
	22																22	
16	23	3	1	38	♊	29	52	11		10	29	44	♊	29	47	4	23	3
5	24	23	10	49	♋	1	21	16									24	
	25									6	39	1	♋	1	16	18	25	14
13	26	11	51	45	♋	2	55	15		19	19	59	♋	2	50	18	26	6
	27																27	
2	28	8	0	57	♋	4	23	19		15	29	3	♋	4	19	19	28	17
10	29	22	42	0	♋	5	58	22									29	
	30									4	10	0	♋	5	53	21	30	9

The LUNAR TABLE *for* July.

Golden Number	Days	Years after Chriſt. ☌ ☉ ☽ ſubſtract.			Years after Chriſt. ☉'s Place add.				Year of Chriſt 00.	Years before Chriſt. ☌ ☽ ☉ add.			Years before Chriſt. ☉'s Place ſubſtract.				Days	Golden Number
		h.	m.	s.	s.	d.	m.	s		h.	m.	s.	s.	d.	m.	s.		
18	1	9	22	58	♋	7	32	21		16	51	5	♋	7	27	22	1	1
	2									13	0	3	♋	8	56	23	2	12
7	3	5	32	8	♋	9	1	20									3	
15	4	18	30	0	♋	10	35	22		1	41	12	♋	10	30	25	4	4
4	5	14	22	10	♋	12	4	24		21	50	23	♋	11	59	29	5	15
	6																6	
12	7	3	3	15	♋	13	38	25		10	31	20	♋	13	33	27	7	7
1	8	23	12	19	♋	15	7	28									8	
	9									6	40	31	♋	15	2	30	9	18
9	10	11	53	22	♋	16	41	29		19	21	31	♋	16	36	30	10	10
	11																11	
17	12	0	34	19	♋	18	15	29		8	2	24	♋	18	10	29	12	2
6	13	20	43	30	♋	19	44	30									13	
	14									4	11	36	♋	19	39	31	14	13
14	15	9	24	27	♋	21	18	31		16	52	34	♋	21	13	32	15	5
	16								Day 19	13	1	44	♋	22	42	34	16	16
3	17	5	33	16	♋	22	47	23	☌ ☉ ☽								17	
11	18	18	14	37	♋	24	21	32	14 23 40	1	42	42	♋	24	16	36	18	8
	19								☉ in	21	51	54	♋	25	45	40	19	19
19	20	6	55	39	♋	25	55	36	♋ 25 50 35								20	
8	21	3	4	43	♋	27	34	36		10	32	53	♋	27	19	40	21	11
16	22	15	45	41	♋	28	58	37		23	13	39	♋	28	53	38	22	3
	23																23	
5	24	11	54	52	♌	0	27	39		19	23	4	♌	0	22	41	24	14
	25																25	
13	26	0	35	49	♌	2	1	39		8	4	2	♌	1	56	43	26	6
2	27	20	45	0	♌	3	30	42									27	
	28									4	13	6	♌	3	25	44	28	17
10	29	9	26	3	♌	5	4	45		16	54	3	♌	4	59	45	29	9
18	30	22	7	1	♌	6	38	45									30	
	31									5	35	8	♌	6	33	46	31	1

The LUNAR TABLE *for* Auguſt.

Golden Number	Days	Years after Chriſt. ☌ ⊙ ☽ ſubſtract.			Years after Chriſt. ⊙'s Place add				Year of Chriſt 00.	Years be foreChriſt ☌ ⊙ ☽ add.			Years before Chriſt. ⊙'s Place ſubſtract.				Days	Golden Number
		h.	m.	s	s.	d.	m.	s.		h.	m.	s	s.	d.	m.	s		
7	1	18	16	5	♌	8	7	44		1	44	6	♌	8	2	45	1	12
	2									14	25	15	♌	9	36	48	2	4
15	3	6	57	3	♌	9	41	45									3	
4	4	3	6	14	♌	11	10	48		10	34	26	♌	11	5	53	4	15
12	5	15	47	18	♌	12	44	50		23	15	24	♌	12	39	51	5	7
	6																6	
1	7	11	56	22	♌	14	13	51		19	24	34	♌	14	14	53	7	18
	8																8	
9	9	0	37	25	♌	15	47	52		8	5	34	♌	15	42	55	9	10
17	10	13	18	23	♌	17	21	53		20	46	27	♌	17	16	55	10	2
	11																11	
6	12	9	27	33	♌	18	50	55		16	55	39	♌	18	45	56	12	13
14	13	22	8	30	♌	20	24	55									13	
	14									5	36	37	♌	20	19	57	14	5
3	15	18	17	15	♌	21	53	56		1	45	48	♌	21	48	59	15	16
	16								Day 18 ☌ ⊙ ☽ 3 7 44 ⊙ in ♌ 24 57 2	14	26	45	♌	23	23	0	16	8
11	17	6	58	40	♌	23	27	57									17	
19	18	19	39	42	♌	25	2	10		10	35	57	♌	24	52	4	18	19
8	19	15	48	47	♌	26	31	2		23	16	56	♌	26	26	4	19	11
	20																20	
16	21	4	29	44	♌	28	5	2		11	57	50	♌	28	0	4	21	3
	22																22	
5	23	0	38	55	♌	29	34	3		8	7	7	♌	29	29	8	23	14
13	24	13	19	52	♍	1	8	4		20	48	5	♍	1	3	9	24	6
	25																25	
2	26	9	29	3	♍	2	37	7		16	57	9	♍	2	32	7	26	17
10	27	22	10	6	♍	4	11	10									27	
	28									5	38	8	♍	4	6	8	28	9
18	29	10	51	4	♍	5	45	11		18	19	11	♍	5	40	11	29	1
	30									14	28	10	♍	7	9	7	30	12
7	31	7	0	8	♍	7	14	9									31	

TABLE IV.

The LUNAR TABLE *for* September.

Golden Number	Days	Years after Chriſt. ☌ ⊙ ☽ ſubſtract.			Years after Chriſt. ⊙'s Place add				Year of Chriſt oo.	Years before Chriſt ☌ ⊙ ☽ add.			Years before Chriſt. ⊙'s Place ſubſtract.				Days	Golden Number
		h.	m.	s.	s.	d.	m.	s		h.	m.	s	s.	d.	m.	s.		
15	1	19	41	6	♍	8	48	11		3	9	19	♍	8	43	14	1	4
4	2	15	50	17	♍	10	17	13		23	18	29	♍	10	12	16	2	15
	3																3	
12	4	4	31	22	♍	11	51	13		11	59	27	♍	11	46	16	4	4
	5																5	
1	6	0	40	15	♍	13	20	16		8	8	31	♍	13	15	17	6	18
9	7	13	21	28	♍	14	54	16		20	49	37	♍	14	49	21	7	10
	8																8	
17	9	2	2	26	♍	16	28	18		9	30	31	♍	16	23	19	9	2
6	10	22	11	36	♍	17	57	20									10	
	11									5	39	32	♍	17	12	19	11	13
14	12	10	52	30	♍	19	31	18		18	20	40	♍	19	26	20	12	5
	13									14	29	51	♍	20	55	24	13	16
3	14	7	1	14	♍	21	0	40									14	
11	15	19	42	43	♍	23	27	57		3	10	49	♍	22	29	25	15	8
	16								Day 16	23	20	0	♍	23	55	26	16	19
19	17	8	23	45	♍	24	8	25	☌ ⊙ ☽								17	
8	18	4	32	50	♍	25	37	26	15 51 47	12	0	59	♍	25	32	28	18	11
16	19	17	13	48	♍	27	11	26	⊙ in								19	
	20								♍ 24 3 24	0	41	53	♍	27	6	27	20	3
5	21	13	22	58	♍	28	40	28		20	51	10	♍	28	35	30	21	14
	22																22	
13	23	2	3	55	♎	0	14	28		9	32	8	♎	0	9	32	23	6
2	24	22	13	6	♎	1	43	32									24	
	25									5	41	13	♎	1	38	32	25	17
10	26	10	54	5	♎	3	17	31		18	22	11	♎	3	12	32	26	9
18	27	23	35	7	♎	4	51	33									27	
	28									7	3	14	♎	5	4	34	28	1
7	29	19	44	12	♎	6	20	33		3	12	13	♎	6	15	31	29	12
	30									15	23	22	♎	7	49	37	30	4

TABLE IV.

The LUNAR TABLE *for* October.

Golden Number	Days	Years after Chriſt ☌ ⊙ ☽ ſubſtract.			Years after Chriſt. ⊙'s Place add				Year of Chriſt oo.	Years before Chriſt ☌ ⊙ ☽ add.			Years before Chriſt. ⊙'s Place ſubſtract.				Days	Golden Number
		h.	m.	s.	s.	d.	m.	s.		h.	m.	s.	s.	d.	m.	s.		
15	1	8	25	9	♎	7	54	35									1	
4	2	4	34	20	♎	9	23	36		12	2	32	♎	9	18	38	2	15
12	3	17	15	25	♎	10	57	40									3	
	4									0	43	30	♎	10	52	40	4	7
1	5	13	24	28	♎	12	26	40		20	52	34	♎	12	21	40	5	18
	6																6	
9	7	2	5	31	♎	14	47	53		9	33	40	♎	13	55	43	7	10
17	8	14	46	29	♎	15	34	42		22	14	34	♎	15	29	43	8	2
	9																9	
6	10	10	55	39	♎	17	3	45		18	23	35	♎	16	58	40	10	13
14	11	23	36	33	♎	18	37	43									11	
	12									7	4	44	♎	18	32	46	12	5
3	13	19	45	18	♎	20	6	45		3	13	54	♎	20	1	48	13	16
	14									15	54	52	♎	21	35	49	14	8
11	15	8	26	47	♎	21	40	48									15	
19	16	21	7	48	♎	23	14	49	Day 16 ☌ ⊙ ☽ 4 35 50 ⊙'s Place ♎ 23 9 49	12	4	3	♎	23	58	28	16	19
8	17	17	16	53	♎	24	43	51									17	
	18									0	45	2	♎	24	38	52	18	11
16	19	5	57	51	♎	26	17	50		13	25	56	♎	26	12	52	19	3
	20																20	
5	21	2	7	1	♎	27	46	43		9	35	13	♎	27	41	55	21	14
13	22	14	47	58	♎	29	20	52		22	16	11	♎	29	15	58	22	6
	23																23	
2	24	10	57	10	♏	0	49	56		18	25	16	♏	0	44	56	24	17
10	25	23	38	8	♏	2	23	55									25	
	26									7	6	15	♏	2	18	57	26	9
18	27	12	19	10	♏	3	57	57		19	47	17	♏	3	52	58	27	1
	28									15	56	16	♏	5	21	58	28	12
7	29	8	28	15	♏	5	26	58									29	
15	30	21	9	13	♏	7	0	59		4	37	25	♏	6	56	2	30	4
4	31	17	18	23	♏	8	30	0									31	

The Lunar Table *for* November.

Golden Number	Days	Years after Chriſt. ☌ ☉ ☽ ſubſtract.			Years after Chriſt. ☉'s Place add.				Year of Chriſt 00.	Years before Chriſt. ☌ ☉ ☽ add.			Years before Chriſt. ☉'s Place ſubſtract.				Days	Golden Number
		h.	m.	s.	s.	d.	m.	s.		h.	m.	s.	s.	d.	m.	s.		
	1									0	46	35	♏	8	25	3	1	15
12	2	5	59	28	♏	10	4	4		13	27	33	♏	9	59	5	2	7
	3																3	
1	4	2	8	31	♏	11	33	4		9	36	38	♏	11	28	5	4	18
9	5	14	49	34	♏	13	7	5		22	17	43	♏	13	2	9	5	10
	6																6	
17	7	3	30	32	♏	14	41	6		10	58	37	♏	14	36	6	7	2
6	8	23	39	43	♏	16	10	7									8	
	9									7	7	38	♏	16	5	9	9	13
14	10	12	20	36	♏	17	44	6		19	48	47	♏	17	39	10	10	5
	11								Day 14 ☌ ☉ ☽ 17 19 53 ☉ in ♏ 22 16 23	15	57	57	♏	19	8	12	11	16
3	12	8	29	21	♏	19	13	9									12	
11	13	21	10	50	♏	20	47	11		4	38	55	♏	20	43	13	13	8
	14																14	
19	15	9	51	52	♏	22	21	13		0	48	6	♏	22	11	16	15	15
8	16	6	0	56	♏	23	50	14		13	29	5	♏	23	45	16	16	11
16	17	18	41	54	♏	25	24	13									17	
	18									2	9	59	♏	25	19	17	18	3
5	19	14	51	4	♏	26	53	17		22	19	17	♏	26	48	20	19	14
	20																20	
13	21	3	32	1	♏	28	27	16		11	0	15	♏	28	22	22	21	6
2	22	23	41	13	♏	29	56	21									22	
	23									7	9	19	♏	29	51	20	23	17
10	24	12	22	15	♐	1	30	20		19	50	18	♐	1	25	22	24	9
	25																25	
18	26	1	3	13	♐	3	4	22		8	31	20	♐	2	59	23	26	1
7	27	21	12	18	♐	4	33	22		4	40	27	♐	4	28	24	27	12
	28									17	21	28	♐	6	2	25	28	4
15	29	9	53	16	♐	6	7	22									29	
4	30	6	2	26	♐	7	36	25		13	30	38	♐	7	31	27	30	15

TABLE IV.

The LUNAR TABLE *for* December.

Golden Number	Days	Years after Christ ☌ ☉ ☽ ſubſtract.			Years after Christ. ☉'s Place add.				Year of Christ 00.	Years before Christ. ☌ ☉ ☽ add.			Years before Christ. ☉'s Place ſubſtract.				Days	Golden Number
		h.	m.	s.	s.	d.	m.	s.		h.	m.	s.	s.	d.	m.	s.		
12	1	18	43	31	♐	9	10	25									1	
	2									2	11	36	♐	9	5	28	2	7
1	3	14	52	34	♐	10	39	29		22	20	41	♐	10	34	29	3	18
	4																4	
9	5	3	33	38	♐	12	13	29		11	1	47	♐	12	8	30	5	10
17	6	16	14	35	♐	13	47	29		23	42	40	♐	13	42	30	6	2
	7																7	
6	8	12	23	46	♐	15	16	30		19	51	41	♐	15	11	29	8	13
	9																9	
14	10	1	4	40	♐	16	50	30		8	32	50	♐	16	45	35	10	5
3	11	21	13	48	♐	18	19	34	Day 14	4	42	0	♐	18	14	36	11	16
	12								☌ ☉ ☽	17	22	58	♐	19	48	37	12	8
11	13	9	54	53	♐	19	53	36	6 3 5								13	
19	14	22	35	55	♐	21	27	38	☉'s Place	13	32	10	♐	21	17	39	14	19
8	15	18	44	59	♐	22	56	38	♐ 21 22 28								15	
	16									2	13	8	♐	22	51	41	16	11
16	17	7	25	57	♐	24	30	38		4	54	2	♐	24	25	41	17	3
	18																18	
5	29	3	38	8	♐	25	59	41		11	3	20	♐	25	54	42	19	14
13	20	16	16	4	♐	27	33	41		23	44	18	♐	27	28	46	20	6
	21																21	
2	22	12	25	16	♐	29	2	43		19	53	22	♐	28	57	45	22	17
	23																23	
10	24	1	6	15	♑	0	36	44		8	34	21	♑	0	31	46	24	9
18	25	13	47	17	♑	2	10	45		21	15	23	♑	2	54	48	25	1
	26									17	24	30	♑	3	34	48	26	12
7	27	7	56	21	♑	3	39	45									27	
15	28	22	37	19	♑	5	13	46		6	5	31	♑	5	8	50	28	4
4	29	18	46	29	♑	6	42	49									29	
	30									2	14	42	♑	6	37	52	30	15
12	31	7	27	34	♑	8	16	53		14	55	40	♑	8	11	52	31	7

TABLE V.

A Table of the Revolutions of the Ecliptick Cycle, to be ſubſtracted from the mean Conjunction, *Table* VII. for the Years after Chriſt's Nativity, and added for the Years before it.

	d.	h.	m.
1	1	20	5
2	3	16	10
3	5	12	15
4	7	8	20
5	9	4	25
6	11	0	30
7	12	20	35
8	14	16	40
9	16	12	45
10	18	8	50
11	20	4	55
12	22	1	0
13	23	21	5
14	25	17	10
15	27	13	15
16	29	9	20
17	31	5	25
18	33	1	30
19	34	21	35
20	36	17	40
40	73	11	20
60	110	5	0

TABLE VI.

A Table of the Sun's Place to be added to its Place in *Table* VII. for the Years after Chriſt's Nativity, or ſubſtracted from the Table for the Years before it.

	s.	d.	m.	s.
1	0	1	6	29
2	0	2	12	58
3	0	3	19	27
4	0	4	25	56
5	0	5	32	25
6	0	6	38	54
7	0	7	45	23
8	0	8	51	52
9	0	9	58	21
10	0	11	4	50
11	0	12	11	19
12	0	13	17	48
13	0	14	24	17
14	0	15	30	46
15	0	16	37	15
16	0	17	43	44
17	0	18	50	13
18	0	19	56	42
19	0	21	3	11
20	0	22	9	40
40	1	14	19	20
60	2	6	29	0

TABLE VII.

The ECLIPTICK CALENDAR *for* January.

Ecliptick Number	Days	Years after Christ. ☌ ☉ ☊ or ☋ subtract.			Years after Christ. ☉'s Place add.				Year of Christ 00.	Years before Christ. ☌ ☉ ☊ or ☋ add.			Years before Christ. ☉'s Place subtract.				Days	Ecliptick Number
		h.	m.		s.	d.	m.	s.		h.	m.		s.	d.	m.	s.		
47	1	2	48	☋	♑	8	50	21									1	
19	2	20	5	☊	♑	10	19	25		3	20	☊	♑	9	8	38	2	74
	3																3	
	4									13	15	☋	♑	11	48	19	4	9
84	5	6	54	☋	♑	12	59	5									5	
	6									6	33	☊	♑	13	17	13	6	37
56	7	0	8	☊	♑	14	28	0		23	40	☋	♑	14	46	8	7	65
28	8	17	24	☋	♑	15	56	54									8	
	9																9	
93	10	4	12	☊	♑	18	36	34		4	12	☊	♑	18	36	34	10	93
65	11	21	26	☋	♑	20	5	28	Day 10								11	
	12								☌ ☉ ☊	3	55	☋	♑	18	54	40	12	28
37	13	14	49	☊	♑	22	36	41	10 33	20	58	☊	♑	20	23	36	13	56
	14								☉ in								14	
9	15	7	57	☋	♑	23	3	15	♑ 17 25 37	14	24	☋	♑	21	52	29	15	84
	16																16	
74	17	18	44	☊	♑	25	42	57		1	9	☊	♑	24	32	10	17	19
	18									18	18	☋	♑	26	1	5	18	47
46	19	11	56	☋	♑	27	11	51									19	
	20									11	38	☊	♑	27	29	57	20	75
18	21	5	9	☊	♑	28	40	44									21	
	22									22	23	☋	♒	0	9	39	22	10
83	23	16	2	☋	♒	1	20	24									23	
	24									15	41	☊	♒	1	38	33	24	38
55	25	19	16	☊	♒	2	48	18									25	
	26									8	48	☋	♒	3	7	26	26	66
27	27	2	32	☋	♒	4	18	13									27	
	28									19	41	☊	♒	5	46	47	28	1
92	29	13	20	☊	♒	6	57	52									29	
	30									12	53	☋	♒	7	16	1	30	29
	31	6	34	☋	♒	8	26	47									31	

The ECLIPTICK CALENDAR *for* February.

Ecliptick Number	Days	Years after Chriſt. ☌ ☉ ☊ or ☋ ſubſtract.			Years after Chriſt. ☉'s Place add.				Year of Chriſt 00.	Years before Chriſt. ☌ ☉ ☊ or ☋ add.			Years before Chriſt. ☉'s Place ſubſtract.				Days	Ecliptick Number
		h.	m.		s.	d.	m.	s.		h.	m.		s.	d.	m.	s.		
36	1	23	48	☊	♒	9	55	42		6	6	☊	♒	8	44	57	1	57
	2									23	22	☋	♒	10	13	45	2	35
8	3	17	5	☋	♒	11	24	38									3	
	4																4	
73	5	3	56	☊	♒	14	1	2		10	17	☊	♒	12	53	29	5	20
45	6	21	4	☋	♒	15	33	10									6	
	7									3	26	☋	♒	14	22	24	7	48
17	8	14	27	☊	♒	17	2	5		20	46	☊	♒	15	21	17	8	76
	9																9	
	10									7	31	☋	♒	18	30	58	10	11
82	11	1	10	☋	♒	19	41	44									11	
54	12	18	24	☊	♒	21	10	38		0	40	☊	♒	19	59	53	12	39
	13									17	56	☋	♒	21	48	26	13	67
26	14	11	40	☋	♒	22	39	22									14	
	15																15	
91	16	22	28	☊	♒	25	19	11		4	49	☊	♒	24	8	26	16	2
	17									22	1	☋	♒	25	37	1	17	30
63	18	15	42	☋	♒	26	48	7									18	
	19									15	14	☊	♒	27	6	15	19	58
35	20	8	56	☊	♒	28	17	1									20	
	21									8	30	☋	♒	28	35	8	21	86
7	22	2	13	☋	♒	29	45	55									22	
	23									19	25	☊	♓	1	14	28	23	21
72	24	13	4	☊	♓	2	25	34									24	
	25									12	34	☋	♓	2	43	44	25	49
49	26	6	15	☋	♓	3	54	29									26	
16	27	23	25	☊	♓	5	23	24		5	54	☊	♓	4	12	39	27	77
	28																28	
	29									16	39	☋	♓	6	52	17	29	12
		Biſſ.			Biſſ.					Biſſ.			Biſſ.					

TABLE VII.

The Ecliptick Calendar *for* March.

Ecliptick Number	Days	Years after Christ. ☌ ☉ ☊ or ☋ subtract.			Years after Christ. ☉'s Place add.				Year of Christ 00.	Years before Christ. ☌ ☉ ☊ or ☋ add.			Years before Christ. ☉'s Place subtract.				Days	Ecliptick Number
		h.	m.		s.	d.	m.	s.		h.	m.		s.	d.	m.	s.		
81	1	10	18	☋	♓	8	3	3									1	
	2									9	50	☊	♓	8	21	12	2	40
53	3	3	32	☊	♓	9	31	57									3	
29	4	20	48	☋	♓	11	0	51		3	4	☋	♓	9	50	6	4	68
	5																5	
	6									13	57	☊	♓	12	29	46	6	3
90	7	7	36	☊	♓	13	40	33									7	
	8									7	9	☋	♓	13	58	40	8	31
62	9	0	50	☋	♓	15	9	26									9	
34	10	18	4	☊	♓	16	38	20		0	22	☊	♓	15	27	44	10	59
	11									17	38	☋	♓	16	56	23	11	87
6	12	11	16	☋	♓	18	7	10									12	
	13																13	
71	14	22	12	☊	♓	20	46	53		4	33	☊	♓	19	36	7	14	22
	15									21	42	☋	♓	21	5	3	15	50
43	16	15	20	☋	♓	22	15	48									16	
	17									14	52	☊	♓	23	27	46	17	78
15	18	8	33	☊	♓	23	44	42									18	
80	29	19	26	☋	♓	26	24	22									19	
	20									1	47	☋	♓	25	13	36	20	13
52	21	12	40	☊	♓	27	53	15		18	58	☊	♓	26	42	30	21	41
	22																22	
24	23	5	56	☋	♓	29	22	34		12	12	☋	♓	28	11	19	23	69
	24									23	5	☊	♈	0	51	5	24	4
89	25	16	44	☊	♈	2	1	51									25	
	26									16	17	☋	♈	2	19	58	26	26
61	27	9	58	☋	♈	3	30	44									27	
	28									9	30	☊	♈	3	48	52	28	60
33	29	3	12	☊	♈	4	59	39									29	
5	30	20	24	☋	♈	6	28	32		2	46	☋	♈	5	17	40	30	88
	31																31	

The ECLIPTICK CALENDAR *for* April.

Ecliptick Number	Days	Years after Chriſt. ☌ ⊙ ☊ or ☋ ſubſtract.			Years after Chriſt. ⊙'s Place add.				Year of Chriſt 00.	Years before Chriſt. ☌ ⊙ ☊ or ☋ add.			Years before Chriſt. ⊙'s Place ſubſtract.				Days	Ecliptick Number
		h.	m.		s.	d.	m.	s.		h.	m.		s.	d.	m.	s.		
	1									13	41	☊	♈	7	57	26	1	23
70	2	7	20	☊	♈	9	8	12									2	
	3									6	50	☋	♈	9	26	52	3	51
42	4	0	28	☋	♈	10	37	7									4	
14	5	17	41	☊	♈	12	6	1		0	0	☊	♈	10	58	26	5	79
	6																6	
	7									10	58	☋	♈	13	34	55	7	14
79	8	4	44	☋	♈	14	45	41									8	
51	9	21	48	☊	♈	16	14	34		4	6	☊	♈	15	3	59	9	42
	10									21	20	☋	♈	16	32	44	10	70
23	11	14	57	☋	♈	17	43	31									11	
	12																12	
88	13	1	52	☊	♈	20	23	10		8	13	☊	♈	19	12	23	13	5
60	14	19	6	☋	♈	21	52	3									14	
	15									1	28	☋	♈	20	41	47	15	33
32	16	12	20	☊	♈	23	20	58		18	38	☊	♈	22	10	11	16	61
	17																17	
4	18	5	32	☋	♈	24	49	52		11	54	☋	♈	23	39	4	18	89
	19									22	49	☊	♈	26	18	45	19	24
69	20	16	28	☊	♈	27	29	32									20	
	21									15	58	☋	♈	27	47	40	21	52
41	22	9	36	☋	♈	28	58	25									22	
	23									9	8	☊	♈	29	16	34	23	80
13	24	2	49	☊	♉	0	27	20									24	
	25									20	3	☋	♉	1	56	13	25	15
78	26	13	42	☋	♉	3	7	0									26	
	27									13	14	☊	♉	3	29	9	27	43
50	28	6	56	☊	♉	4	35	53									28	
	29									6	28	☋	♉	4	53	53	29	71
22	30	0	5	☋	♉	6	4	49									30	

TABLE VII.

The Ecliptick Calendar *for* May.

Ecliptick Number	Days	Years after Christ. ☌ ⊙ ☊ or ☋ subtract.			Years after Christ. ⊙'s Place add.				Year of Christ 00.	Years before Christ. ☌ ⊙ ☊ or ☋ add.			Years before Christ. ⊙'s Place subtract.				Days	Ecliptick Number
		h.	m.		s.	d.	m.	s.		h.	m.		s.	d.	m.	s		
	1									17	21	☊	♉	7	33	44	1	6
87	2	11	0	☊	♉	8	44	28									2	
	3									10	33	☋	♉	9	2	37	3	34
59	4	4	14	☋	♉	10	13	21									4	
31	5	21	28	☊	♉	11	42	16		3	46	☊	♉	10	31	21	5	62
	6									21	2	☋	♉	12	0	23	6	90
3	7	14	40	☋	♉	13	11	9									7	
	8																8	
68	9	1	36	☊	♉	15	50	51		7	57	☊	♉	14	40	4	9	25
40	10	18	40	☋	♉	17	19	45									10	
	11									1	6	☋	♉	16	8	59	11	53
12	12	11	57	☊	♉	18	48	54		18	16	☊	♉	17	37	54	12	81
	13																13	
77	14	22	50	☋	♉	21	28	20		5	11	☋	♉	20	17	33	14	16
	15									22	24	☊	♉	21	46	28	15	44
49	16	16	4	☊	♉	22	57	14									16	
	17									15	3	☋	♉	23	15	23	17	72
21	18	9	13	☋	♉	24	26	9									18	
	19																19	
86	20	20	4	☊	♉	27	5	48		2	29	☊	♉	25	55	10	20	7
	21									19	41	☋	♉	27	23	55	21	35
58	22	13	22	☋	♉	28	34	41									22	
	23									12	24	☊	♉	28	22	50	23	63
30	24	6	36	☊	♊	0	3	36									24	
2	25	23	48	☋	♊	1	2	39		6	10	☋	♊	0	15	23	25	91
	26																26	
	27									17	5	☊	♊	3	1	23	27	26
67	28	10	38	☊	♊	4	12	20									28	
	29									10	14	☋	♊	24	10	19	29	54
39	30	3	48	☋	♊	5	41	4									30	
11	31	21	5	☊	♊	7	9	58		3	24	☊	♊	5	59	13	31	82

TABLE VII.

The ECLIPTICK CALENDAR *for* June.

Ecliptick Number	Days	Years after Chriſt. ☌ ☉ ☊ or ☋ ſubſtract.			Years after Chriſt. ☉'s Place add				Year of Chriſt 00.	Years before Chriſt. ☌ ☉ ☊ or ☋ add.			Years before Chriſt. ☉'s Place ſubſtract.				Days	Ecliptick Number
		h.	m.		s.	d.	m.	s.		h.	m.		s.	d.	m.	s.		
	1																1	
76	2	7	58	☋	♊	9	49	39		14	19	☋	♊	8	38	54	2	17
	3																3	
48	4	1	12	☊	♊	11	18	33		7	30	☊	♊	10	7	46	4	45
20	5	13	21	☋	♊	12	47	26									5	
	6									0	44	☋	♊	11	36	51	6	73
	7									11	37	☊	♊	14	16	21	7	8
85	8	5	12	☊	♊	15	27	7									8	
57	9	22	30	☋	♊	16	55	57		4	49	☋	♊	15	45	15	9	36
	10									22	2	☊	♊	17	14	9	10	64
29	11	15	44	☊	♊	18	24	56									11	
	12									15	8	☋	♊	18	43	3	12	92
1	13	8	52	☋	♊	19	53	40									13	
	14																14	
66	15	19	46	☊	♊	22	33	29		2	13	☊	♊	21	22	42	15	27
	16									19	22	☋	♊	22	51	36	16	55
38	17	12	56	☋	♊	24	2	24									17	
	18									12	32	☊	♊	24	20	32	18	83
10	19	6	13	☊	♊	25	31	17									19	
	20									23	27	☋	♊	27	0	12	20	18
75	21	17	6	☋	♊	28	10	58									21	
	22									16	38	☊	♊	28	29	0	22	46
47	23	10	16	☊	♊	29	39	52									23	
	24									9	52	☋	♊	29	57	57	24	74
19	25	3	29	☋	♋	1	8	37									25	
84	26	14	16	☊	♋	3	48	26		20	21	☊	♋	2	37	40	26	9
	27																27	
56	28	7	38	☋	♋	5	17	19		13	57	☋	♋	4	6	34	28	37
	29																29	
28	30	0	52	☊	♋	6	46	11		7	10	☊	♋	5	25	37	30	65

TABLE VII.

The ECLIPTICK CALENDAR *for* July.

Ecliptick Number	Days	Years after Chriſt. ☌ ⊙ ☊ or ☋ ſubſtract. h. m.	Years after Chriſt. ⊙'s Place add. s. d. m. s	Year of Chriſt 00.	Years before Chriſt. ☌ ⊙ ☊ or ☋ add h. m.	Years before Chriſt. ⊙'s Place ſubſtract. s. d. m. s.	Days	Ecliptick Number
	1			Day 2			1	
93	2	11 34 ☋	♋ 9 25 54	☌ ⊙ ☋	0 26 ☋	♋ 7 4 22	2	93
	3			18 3	11 21 ☊	♋ 9 44 2	3	28
65	4	4 54 ☊	♋ 10 54 48	⊙ in			4	
37	5	22 4 ☋	♋ 12 23 43	♋ 8 18 7	4 30 ☋	♋ 11 12 56	5	56
	6				21 40 ☊	♋ 12 41 51	6	84
9	7	15 21 ☊	♋ 13 52 37				7	
	8						8	
	9				3 35 ☋	♋ 15 31 21	9	19
74	10	2 14 ☋	♋ 16 32 18				10	
46	11	19 24 ☊	♋ 18 1 11		1 46 ☊	♋ 16 50 25	11	47
	12				19 4 ☋	♋ 18 19 26	12	75
18	13	12 37 ☋	♋ 19 30 4				13	
	14						14	
83	15	23 24 ☊	♋ 22 9 45		5 49 ☊	♋ 20 58 59	15	15
	16				23 5 ☋	♋ 22 27 53	16	38
55	17	16 40 ☋	♋ 23 38 40				17	
	18				16 18 ☊	♋ 23 56 43	18	66
27	19	10 0 ☊	♋ 25 7 33				19	
92	20	20 42 ☋	♋ 27 47 13				20	
	21				37 20 ☋	♋ 26 36 7	21	1
64	22	14 2 ☊	♋ 29 16 7		20 11 ☊	♋ 28 5 22	22	29
	23						23	
36	24	7 12 ☋	♌ 0 45 2		13 28 ☋	♋ 29 34 16	24	57
	25						25	
8	26	0 29 ☊	♌ 2 13 55		6 48 ☊	♌ 1 3 10	26	85
	27				17 43 ☋	♌ 3 42 45	27	20
73	28	11 22 ☋	♌ 4 53 36				28	
	29				10 54 ☊	♌ 5 11 44	29	48
45	30	4 22 ☊	♌ 6 22 29				30	
17	31	21 45 ☋	♌ 7 51 23		4 12 ☋	♌ 6 40 42	31	76

The Ecliptick Calendar *for* Auguſt.

Ecliptick Number	Days	Years after Chriſt. ☌ ☉ ☊ or ☋ ſubſtract. h. m.	Years after Chriſt. ☉'s Place add s. d. m. s.	Year of Chriſt 00.	Years before Chriſt. ☌ ☉ ☊ or ☋ add. h. m.	Years before Chriſt. ☉'s Place ſubſtract. s. d. m. s.	Days	Ecliptick Number
	1						1	
	2				14 57 ☊	♌ 9 20 18	2	11
82	3	8 32 ☊	♌ 10 31 3				3	
	4				8 13 ☋	♌ 10 49 10	4	39
54	5	1 48 ☋	♌ 11 59 58				5	
26	6	19 8 ☊	♌ 13 28 51		1 26 ☊	♌ 12 18 5	6	67
	7						7	
	8				12 15 ☋	♌ 14 57 37	8	2
91	9	5 50 ☋	♌ 16 8 31				9	
63	10	23 10 ☊	♌ 17 37 25		5 19 ☊	♌ 16 26 41	10	30
	11				22 46 ☋	♌ 17 56 1	11	58
37	12	16 20 ☋	♌ 19 6 21				12	
	13				15 56 ☊	♌ 19 24 21	13	86
7	14	9 37 ☊	♌ 20 35 13				14	
72	15	20 30 ☋	♌ 23 14 53				15	
	16				2 51 ☋	♌ 22 3 48	16	21
44	17	13 40 ☊	♌ 24 43 49		20 2 ☊	♌ 23 33 3	17	49
	18						18	
16	19	6 53 ☋	♌ 26 12 42		13 20 ☋	♌ 25 1 57	19	77
	20						20	
81	21	17 40 ☊	♌ 28 52 23		0 5 ☊	♌ 27 41 38	21	12
	22				17 14 ☋	♌ 29 10 32	22	40
53	23	10 56 ☋	♍ 0 21 18				23	
	24				10 34 ☊	♍ 0 39 26	24	68
25	25	4 16 ☊	♍ 1 50 11				25	
	26				21 23 ☋	♍ 3 59 5	26	3
90	27	14 58 ☋	♍ 4 29 52				27	
	28				14 37 ☊	♍ 4 47 59	28	31
62	29	8 18 ☊	♍ 5 58 45				29	
	30				7 54 ☋	♍ 6 16 53	30	59
34	31	1 28 ☋	♍ 7 27 41				31	

The ECLIPTICK CALENDAR for September.

Ecliptick Number	Days	Years after Chriſt. ☌ ☉ ☊ or ☋ ſubſtract.			Years after Chriſt. ☉'s Place add				Year of Chriſt oo.	Years before Chriſt ☌ ☉ ☊ or ☋ add.			Years before Chriſt. ☉'s Place ſubtract.				Days	Ecliptick Number
		h.	m.		s.	d.	m.	s.		h.	m.		s.	d.	m.	s.		
6	1	18	40	☊	♍	8	56	34		1	4	☊	♍	7	45	48	1	87
	2																2	
	3									11	59	☋	♍	10	25	19	3	22
71	4	5	38	☋	♍	11	35	12									4	
43	5	22	48	☊	♍	13	5	8		5	10	☊	♍	11	54	23	5	50
	6									22	28	☋	♍	13	23	16	6	78
15	7	16	1	☋	♍	14	34	2									7	
	8																8	
80	9	2	48	☊	♍	17	13	42		9	13	☊	♍	16	2	56	9	13
52	10	20	4	☋	♍	18	42	35									10	
	11									2	22	☋	♍	17	31	50	11	41
24	12	13	24	☊	♍	20	11	26		19	42	☊	♍	19	0	53	12	69
	13																13	
	14									6	31	☋	♍	21	40	24	14	4
89	15	0	6	☋	♍	22	51	11		23	45	☊	♍	23	9	17	15	32
61	16	17	26	☊	♍	24	20	4									16	
	17																17	
33	18	10	36	☋	♍	25	49	0		17	1	☋	♍	24	38	13	18	60
	19									20	12	☊	♍	26	7	7	19	88
5	20	3	48	☊	♍	27	17	53									20	
	21									21	7	☋	♍	28	46	45	21	23
70	22	14	46	☋	♍	29	57	32									22	
	23									14	18	☊	♎	0	15	42	23	51
42	24	7	56	☊	♎	1	20	25									24	
	25									7	36	☋	♎	1	41	24	25	79
14	26	1	9	☋	♎	2	55	19									26	
	27									18	21	☊	♎	4	24	15	27	14
79	28	11	56	☊	♎	5	35	2									28	
	29									11	30	☋	♎	5	55	10	29	42
51	30	5	12	☋	♎	7	3	55									30	

The ECLIPTICK CALENDAR *for* October.

Ecliptick Number	Days	Years after Chriſt. ☌ ⊙ ☊ or ☋ ſubſtract.			Years after Chriſt. ⊙'s Place add.				Year of Chriſt 00.	Years before Chriſt. ☌ ⊙ ☊ or ☋ add.			Years before Chriſt. ⊙'s Place ſubſtract.				Days	Ecliptick Number
		h.	m.		s.	d.	m.	s.		h.	m.		s.	d.	m.	s.		
23	1	22	32	☊	♎	8	32	49		4	5	☊	♎	7	22	4	1	70
	2																2	
88	3	9	14	☋	♎	11	12	30		15	39	☋	♎	10	1	44	3	5
	4																4	
60	5	2	34	☊	♎	12	41	23		8	53	☊	♎	11	30	37	5	33
32	6	19	44	☋	♎	14	10	18									6	
	7									2	0	☋	♎	12	59	33	7	61
4	8	12	58	☊	♎	15	39	13		19	20	☊	♎	14	28	6	8	89
	9																9	
69	10	23	54	☋	♎	18	18	51		6	15	☋	♎	17	8	5	10	24
	11									23	26	☊	♎	18	36	59	11	52
41	12	17	4	☊	♎	19	47	46									12	
	13									17	45	☋	♎	20	5	55	13	80
14	14	10	17	☋	♎	21	16	41									14	
	15																15	
78	16	21	4	☊	♎	23	56	20		3	29	☊	♎	22	45	33	16	15
	17									20	38	☋	♎	24	14	28	17	43
50	18	14	20	☋	♎	25	25	15									18	
	19									13	58	☊	♎	25	43	23	19	71
22	20	17	33	☊	♎	26	54	39		0	47	☋	♎	28	23	4	20	6
	21																21	
37	22	18	22	☋	♎	29	33	49									22	
	23									18	1	☊	♎	29	51	56	23	34
59	24	11	42	☊	♏	1	2	42									24	
	25									11	8	☋	♏	1	20	52	25	62
31	26	4	52	☋	♏	2	31	37									26	
3	27	22	6	☊	♏	4	56	7		4	28	☊	♏	2	49	43	27	27
	28																28	
68	29	9	2	☋	♏	6	40	11		15	23	☋	♏	5	29	24	29	85
	30																30	
40	31	2	12	☊	♏	8	9	5		8	34	☊	♏	6	58	19	31	53

TABLE VII.

The ECLIPTICK CALENDAR *for* November.

Ecliptick Number	Days	Years after Chriſt. ☌ ☉ ☊ or ☋ ſubſtract.			Years after Chriſt. ☉'s Place add.				Year of Chriſt 00.	Years before Chriſt. ☌ ☉ ☊ or ☋ add.			Years before Chriſt. ☉'s Place ſubſtract.				Days	Ecliptick Number
		h.	m.		s.	d.	m.	s.		h.	m.		s.	d.	m.	s.		
12	1	19	25	☋	♏	9	37	58									1	
	2									1	52	☋	♏	8	27	12	2	81
	3									12	37	☊	♏	11	6	54	3	16
77	4	6	12	☊	♏	12	17	40									4	
49	5	23	28	☋	♏	13	46	33		5	46	☋	♏	12	35	47	5	44
	6									23	6	☊	♏	14	4	41	6	72
21	7	16	41	☊	♏	15	15	28									7	
	8																8	
	9									9	55	☋	♏	16	44	21	9	7
86	10	3	30	☋	♏	17	55	7									10	
58	11	20	50	☊	♏	19	24	0		3	9	☊	♏	18	13	14	11	35
	12									20	16	☋	♏	19	42	10	12	63
30	13	14	0	☋	♏	20	52	56									13	
	14									13	36	☊	♏	21	11	3	14	91
2	15	7	14	☊	♏	22	21	50									15	
	16																16	
67	17	18	2	☋	♏	25	1	40		0	31	☋	♏	23	50	43	17	26
	18									17	42	☊	♏	25	19	38	18	54
39	19	11	16	☊	♏	26	30	25									19	
	20									11	0	☋	♏	26	48	32	20	82
11	21	4	33	☋	♏	27	59	17									21	
76	22	15	20	☊	♐	0	39	0		21	45	☊	♏	29	28	12	22	17
	23																23	
48	24	8	36	☋	♐	2	7	52		14	54	☋	♐	1	57	7	24	45
	25																25	
20	26	1	49	☊	♐	3	36	46		8	14	☊	♐	2	25	55	26	73
	27									19	3	☋	♐	5	5	40	27	8
85	28	12	34	☋	♐	6	16	9									28	
	29									12	17	☊	♐	6	34	44	29	36
57	30	5	58	☊	♐	7	45	30									30	

The Ecliptick Calendar *for* December.

Ecliptick Number	Days	Years after Christ ☌ ☉ ☊ or ☋ ſubſtract.			Years after Christ. ☉'s Place add.				Year of Christ 00.	Years before Christ. ☌ ☉ ☊ or ☋ add.			Years before Christ. ☉'s Place ſubſtract.				Days	Ecliptick Number
		h.	m.		s.	d.	m.	s.		h.	m.		s.	d.	m.	s.		
29	1	23	8	☋	♐	9	14	14		5	24	☋	♐	8	3	21	1	64
	2									22	24	☊	♐	9	32	23	2	92
1	3	16	22	☊	♐	10	43	8									3	
	4																4	
	5									9	39	☋	♐	12	12	1	5	27
66	6	3	10	☋	♐	13	22	49									6	
38	7	20	24	☊	♐	14	51	43		2	50	☊	♐	13	40	57	7	55
	8									20	8	☋	♐	15	9	42	8	83
10	9	13	41	☋	♐	16	20	38									9	
	10																10	
	11									6	53	☊	♐	17	49	31	11	18
75	12	0	28	☊	♐	19	0	9									12	
47	13	17	40	☋	♐	20	29	13		0	2	☋	♐	19	18	20	13	46
	14									17	22	☊	♐	19	47	19	14	74
19	15	10	57	☊	♐	21	58	6									15	
	16																16	
84	17	21	42	☋	♐	24	37	46		4	11	☋	♐	23	26	59	17	9
56	18	15	6	☊	♐	26	6	50		21	25	☊	♐	24	55	54	18	37
	19																19	
	20									14	32	☋	♐	26	24	48	20	65
28	21	8	16	☋	♐	27	25	33	Day 23								21	
93	22	19	2	☊	♑	0	15	13	☌ ☉ ☊	7	52	☊	♐	27	53	40	22	93
	23								1 29	14	47	☋	♑	0	33	20	23	28
65	24	12	18	☋	♑	1	44	8	☉ in								24	
	25								♐ 29 4 27								25	
37	26	5	32	☊	♑	3	13	2		11	58	☊	♑	2	2	17	26	56
9	27	22	49	☋	♑	4	41	56		5	16	☋	♑	3	31	10	27	84
	28																28	
	29									16	1	☊	♑	6	10	51	29	19
74	30	9	36	☊	♑	7	21	37									30	
	31									9	10	☋	♑	7	39	45	31	47

EXAMPLES

FOR THE

PRACTICE

OF THE

GOLDEN NUMBER,

To find thereby the

Change or Age of the Moon, taken out of *The Scripture Chronology demonſtrated by Aſtronomical Obſervations.*

N. B. 1. THAT in theſe *Calculations* for the Years before *Chriſt's Nativity* an Hour and a Day muſt be inſerted for the *Biſſextile Year* of *Chriſt* 00 according to the Vulgar Account, which is omitted in moſt other *Chronological Tables*.

2. That in the Years before *Joſhua* twelve Hours muſt be allowed for the *Sun's* ſtanding ſtill in his Time, all the other Orbs moving in the mean while according to their conſtant Courſe.

3. To find the *Sundays*, and conſequently any Day of the Week, in any Day or Year given, take this Method. Divide the *Julian Period* for that Year by 28, the Remainder is the *Cycle* of the *Sun* for that Year. Then look into the *Table* of the *Moveable Feaſts* for GF, reckon from thence incluſively to the ſaid Number (or by a *Table* for that Purpoſe) ſo ſhall

you find the *Dominical Letter* for that Year, by which the *Sundays* are found out in any common *Calendar*, and conſequently any other Day of the Week.

Example 1. The *Sun* was created, as it is generally ſuppoſed, on the Point of the *Autumnal Equinox*, or on *Thurſday*, *Oct.* 25, reckoning the Day to begin at *Sun ſetting* before, and that the Sabbath was on *Sunday*, as it certainly was before the Time of *Moſes*, and the *Moon* was then *a great Light*. The World was created *Anno ante Chriſtum* 4007 *Periodi Julianæ* 706. The *Cycle* of the *Sun* 6, *Dominical Letter* G. In the *Longitude* of *Babylon*, and at *Sunſet* on *Wedneſday*, *Oct.* 24, the *Sun* was in ♍ 29, 18, and the *Moon* in ♈ 10, 20, which was but 11 *Degrees* Diſtance from its *Full*, and is a remarkable Poſition to fix the Year of the Creation. *See* Scripture *Chronology*, Page 9, &c.

N. B. 4. The *Jews* reckoned their *Lunar Months* not from her real Change, but from her firſt Appearance in the Evening, whenever her *oblique Deſcenſion* was above twelve *Degrees* diſtant from that of the *Sun*, and the firſt Day of the Month was from that *Sun's* ſetting to the next.

5. The *Jews* began their Years, not from the Change of the *Moon*, which immediately followed the Touching of the *Sun* on the *Equinox*; but the full *Moon*, which immediately followed it, was always the Middle of the firſt Month, as in *Autumn* before the Time of *Moſes*, and in the Spring after it.

6. That *God* might give the greater Sanction to the firſt Day of the Week as the Day of the *Chriſtian* and *Antemoſaical* Sabbath, his chief Appearances, and the moſt ſolemn Acts of Devotion were performed on this Day. On this Day alone the wave Offering was offered in the Time of the Law. And alſo,

Example 2. In the ſix hundredth Year of *Noah's* Life, on the tenth Day of the ſecond Month *God* commanded him to come with all his Houſhold into the Ark. The following ſix Days of the Week

Noah was conſtantly employed in this Buſineſs. The next Day being the ſeventeenth Day of the Month he reſted from his Labours according to *God's* Appointment, and both theſe Days were on the *Antemoſaical Sabbath.* The *Julian Period* was 2361, which being divided by 28, the Remainder is 9; ſo that it is a Biſſextile Year, and the *Dominical Letter* for the latter Part thereof is C. It appears alſo by Calculation, that in the ſame Year the *Sun* came to the *Autumnal Equinox* on the thirteenth Day of *October*, and that the New Moon was then firſt viſible on the Evening before, and conſequently that the Year began on that Day; ſo that the tenth and ſeventeenth Days of the antient ſecond Month happened to be on the twenty-firſt and twenty-eighth Days of *November*, whoſe Letter is C, and anſwers accordingly. *See* The Scripture Chronology, *Page* 31, &c.

Example 3. In the ſix hundred and firſt Year of *Noah*'s Life, on the twenty-ſecond Day of the ſecond Month *God* ſpake to *Noah* to come out of the Ark, and on the fourth Day of the third Month it is ſuppoſed, that he offered up his ſolemn Sacrifice. And theſe two Days will appear to be on the Days of the *Antemoſaical Sabbath.* The *Julian Period* was 2362. The *Cycle* of the *Sun* is 10, and the *Dominical Letter* is B. The *Sun* in that Year came to the *Autumnal Equinox* as before. The *New Moon*, whoſe Full did happen immediately after, might be ſeen on the firſt Day of *October* in the Evening, ſo that the ſecond was the Day of the new Year; and the Days before mentioned happened to be on the 27th Day of *November* and the fourth Day of *December*, whoſe Letter is B, the *Dominical Letter* for that Year. *See* The Scripture Chronology, *Page* 32, &c.

Example 4. In the four hundredth and thirtieth Year before the going out of the *Iſraelites* from *Egypt*, on the fourteenth Day of the ſeventh Month in the Spring, *God* gave *Abraham* the Promiſe. This was in the Year of the *Julian Period* 2788, the *Cycle* of the

Sun is 16, and the *Dominical Letter* for that Year is B. The *Sun* came to the *Autumnal Equinox* on the tenth Day of *October* in the *Longitude* of *Ur* of the *Chaldees*, and the *Moon* was viſible on the twelfth Day in the Evening; and conſequently the Year began on the thirteenth Day, ſo that the fourteenth Day of the ſeventh Month happened to be on the twenty-fourth Day of *April*, whoſe *Dominical* Letter was B, and conſequently it was the Day of the *Antemoſaical Sabbath*. *See* The Scripture Chronology, *Page* 176, &c.

Example 5. When the *Iſraelites* came out of *Egypt*, they kept the *Paſſover* on the fourteenth Day of the firſt Month in the Spring. The Day following, or the firſt Day after being *Sunday* there was a *holy Convocation*; and the ſeventh Day or *Saturday* there was to be another *holy Convocation*, and then the Sabbath was altered from the firſt Day of the Week to the ſeventh. This was in the Year of the *Julian Period* 3218, the *Cycle* of the *Sun* is 26, and the *Dominical Letter* is C. The *Sun* came to the *Autumnal Equinox* on the ſixth Day of *October* in the *Longitude* of *Rameſes*, the *Moon* was viſible on the twenty-eighth Day of *September*, and the Year began on the 29th. And therefore it appears by Computation, that the fifteenth Day of the firſt Month, as the Year was then changed, was on the eleventh Day of *April*, whoſe *Dominical Letter* is C, as before *See* The Scripture Chronology, *Page* 298, &c. Thus before their *Going* out of *Egypt*, on *Sunday*, *March* 14, the *Antemoſaical Sabbath* is obſerved by the *Egyptians*, and *God* ſends *Moſes* to them at their Devotions by the Banks of the *Nile*. *March* 21, Another *Sabbath* is obſerved as before, and *God* ſends *Moſes* again to foretel the Plague of the Frogs. *March* 28, the Murrain of Beaſts is threatned in the ſame manner. And *April* 4, *Pharaoh* is threatned with the Plague of the Locuſts; ſo that the *Antemoſaical Sabbath* was broken four Times by a divine Command, in the Month before it was altered. *See* The Scripture Chronology, *Page* 423. After that, in the ſame Year, on the Day of the *Chriſtian Sabbath*, *May* 16, the heavenly *Manna* firſt appeared, with which the *Iſraelites* were fed, until they came to *Canaan*, and the Spirit of Prophecy reſted on the ſeventy Elders. *May* 30, On the Day of *Pentecoſt*, being alſo the Day of the *Chriſtian Sabbath*, *God* delivers the Law from Mount *Sinai*, and the *Apoſtles* were afterward inſpired by the *Holy Ghoſt*, *Page* 424. Afterward on the ſame Day of the Week, *June* 6, *Moſes* goes up into the Mount to receive the two Tables of Stone, and received Directions for making the *Tabernacle*, which was a Type of the *Incarnation* of *Jeſus Chriſt*, who was made Fleſh, and fixed his Tabernacle among us. *John* i. 14. *Page* 425. On this Day of the Week, *Auguſt* 15, *Moſes* goes up the ſecond Time into the *Mount*; and *September* 26, the Offerings for the Tabernacle are ordered to be brought. On this Day of the Week, *October* 3, The Feaſt of Expiation for our Sins was firſt obſerved; and *October* 10, the Tabernacle, a Type of *Chriſt*, is begun to be built, *Page* 426.

Example 6. In the Year after the Departure out of *Egypt*, it appears by Calculation, that the *Sun* came to the *Vernal Equinox* on the fourth Day of *April*, and that the *New Moon* was viſible on the twelfth Day of *April* following, ſo that the 13th Day was the Day of the New Year. The *Julian Period* was 3219, which being divided by 28, the Remainder is 27, and ſhews that the *Dominical Letter* for that Year was B. *See* The Scripture Chronology, *Page* 420 *and* 421. In which there were accordingly theſe following Occurrences, on the Day of the Week with the *Chriſtian Sabbath*. *April* 16, *Aaron* and his Sons were conſecrated to the Prieſt's Office on the Day of the *Jewiſh Sabbath*, and begin their Reſt in the *Tabernacle* on the Day of the *Chriſtian*. *April* 24, the reſt of the *Levitical* Laws are written, *Page* 427. *May* 15, the People are numbered, their Standards are ſet up, and their Encampments are ſettled. And the *Jewiſh*

Church becomes moſt glorious on the Day of the *Chriſtian Sabbath*, *Page* 428.

Example 7. The *Iſraelites* entered into the Land of *Canaan* in the Year of the *Julian Period* 3258, The *Cycle* of the *Sun* was 10. and the *Dominical Letter* was B. The Year according to *Calculation* began on the ſecond Day of *April*. And hence it appears, that on the tenth Day of the ſame Month, being the Day of the *Chriſtian Sabbath*, they paſſed over *Jordan* into *Canaan* the Land of Reſt. And on the fifteenth Day of *May* they took *Jericho*, being the firſt Fruits of their Conqueſt, which was alſo the Day of the *Chriſtian Sabbath*. *See* The Scripture Chronology, *Page* 433.

Example 8. The Year following, *Joſhua* having conquered the Kings who beſieged *Gibeon*, ſaw the *Sun* ſtanding over that City, which might be about eleven of the Clock in the Morning; whilſt he was marching toward *Bethoron*, he ſaid, *Sun ſtand thou ſtill upon Gibeon, and thou Moon in the Valley of Ajalon*, which was in the Tribe of *Dan*, and lay Weſtward from *Gilead* in the Place, where the *Sun* and *Moon* did uſually ſet. This fixes that remarkable Day to the eleventh of *April*, when the *Sun* was in ♈ 7. 58, and the *Moon* in ♑ 4. 13, and ſo they might both be ſeen in that Situation. *See* The Scripture Chronology, *Page* 489, &c.

Example 9. In the Year of the *Julian Period* 4705, *Solomon* kept the great Feaſt for the Dedication of the Temple. This Feaſt laſted eight Days, and the firſt and the laſt Days were the moſt remarkable, and both theſe happened on the Days of the *Chriſtian Sabbath*, and on the ſame Days both of the Week and Month, in which our *Saviour* was born and circumciſed, or on the firſt and laſt Days of the Feaſt of *Tabernacles*. Now this *Period* being divided by 28, the Remainder is 9, and ſhews, that C was the *Dominical Letter* for the latter Part of the Year. And according to Calculation the *Moon* was viſible on the ſecond Day of *October*, and the Year began on the third Day of the ſame

Month; ſo that the ſeventeenth and twenty-fourth of that Month were theſe two remarkable Days, whoſe *Dominical Letter* ſhews, that they happened on a *Sunday*. *See* The Scripture Chronology, *Page* 404, &c. For a Proof, that *Our Saviour* was born on the firſt Day of the Feaſt of *Tabernacles* and circumciſed on the eighth, ſee *Joſeph Scaliger*, Dr. *Lightfoot*, and Mr. *Joſeph Mede* on this Subject.

Now if any one ſhould aſk, If *Our Saviour* was born in the Beginning of *October*, why do we obſerve the 25th Day of *December*, and not the right Day? To this I anſwer, that it is better to obſerve the wrong Day than none at all. And ſecondly, that though it was erroneouſly eſtabliſhed at firſt, by a particular Miſtake, as Mr. *Joſeph Mede* hath plainly proved; yet ſince it was firſt eſtabliſhed in the *Latin* Church, and then in the *Greek*, and ſo became an univerſal Cuſtom in all the *Chriſtian Churches* for above twelve hundred Years, a particular Church hath not a ſufficient Authority to make an Alteration, leſt it ſhould make a total Separation from the whole. We know, what a Diſturbance happened between the *Eaſtern* and *Weſtern* Churches, and the ſad Conſequences to this Day concerning the *Proceſſion* of the *Holy Ghoſt*; ſo that we may ſay with St. *James*, *Chap.* iii. 5. *Behold how great Matter a little Fire kindleth.* Or with *Saint Auguſtine*, *Epiſt.* 118. *ad Januarium. Cap.* 5. *Ipſa mutatio conſuetudinis etiam, quæ adjuvat utilitate, novitate perturbat.*

Example 10. *Our Saviour* being born on the firſt Day of the *Feaſt* of *Tabernacles*, and above three full Years before his Birth, according to the *Vulgar Account* (as will be demonſtrated by a particular Eclipſe) the next Queſtion is, upon what Day of the Month and Week was he born? In anſwer to this. On that Year the *Sun* came to the *Autumnal Equinox* on the twenty-fifth Day of *September*. And it appears from *Calculation*, that the *Moon* was viſible on the twenty-ſecond Day of *September* immediately before. Therefore the firſt Day of the Month *Tiſri* or the ſeventh Month, was on the twenty-third Day of *September*, and the fifteenth Day of the Month in which he was born, was on the ſeventh Day of *October*, and his Circumciſion was on the fourteenth. In this Year the *Julian Period* was 4710, which being divided by 28 the Remainder is 6, which ſhews that G was the *Dominical Letter* for that Year, which anſwering to the ſeventh and fourteenth Days of *October* ſhews, that *Our Saviour* was born and circumciſed on the Days of the *Chriſtian Sabbath*. *See* The Scripture Chronology, *Page* 404, &c.

Example the laſt. There hath been a great Controverſy, whether *Our Saviour* was crucified on the fourteenth or on the fifteenth Day of the firſt Month. Now both Parties agree, that he was crucified in the thirty third Year of his Age, according to the *Vulgar Account*, which was on *Friday*, *April* 3. and roſe from the Dead on *Sunday*, *April* 5. This was in the Year of the *Julian Period* 4746, when the *Cycle* of the *Sun* was 14, and conſequently the *Dominical Letter* was D, which anſwers to the fifth Day of *April* accordingly. Now if *Our Saviour* was crucified on the fifteenth Day of the firſt Month, then the *Moon* muſt be viſible on the nineteenth Day of *March* before it, in *Jeruſalem*, after the *Sun* Setting. But that was impoſſible. The *Sun* was then in ♓ 27. 5, and the *Moon* in ♈ 0. 10, which was not above ſix Hours after her Change. But if it was on the fourteenth Day, then the *Moon* was firſt viſible on the twentieth Day of *March*, when her Diſtance from the *Sun* was 17^d. 8^m, and the Difference of their *Oblique Deſcenſion* was 20^d. 9^m, and therefore very viſible. *See* The Scripture Chronology, *Page* 743, *and* 744. Thus we ſee, how the bold Aſſertor of this Miſtake was as much out in his *Mathematicks* as in his *Divinity*. And hence we may alſo obſerve, how the *Sun* and *Moon* from Heaven bear witneſs, to the divine Sanction of the *Chriſtian Sabbath*, or the *Lord's Day* here on Earth.

EXAMPLES *for the Practice of the* ECLIPTICK NUMBER.

HE who would ſee the Falſhood of the antient *Chineſe Chronology*, (notwithſtanding their vain Boaſting and pretended Exactneſs) may conſult the *Tables* in Father *Couplet*'s Hiſtory of *China*, where he particularly mentions the three following *Eclipſes*.

Example 1. In the ſecond Year of the tenth *Cycle* (being 552 Years after the Beginning of them) or as others ſay, in the ſixth Year, there was an *Eclipſe* of the *Sun*, which becauſe the Preſidents of *Aſtronomy Hi* and *Ho* did not diſcover, they were puniſhed with Death. This was in the 2155 or 2152 before the Year of *Chriſt* 00. But both theſe were impoſſible. See *The Scripture Chronology demonſtrated by Aſtronomical Obſervations*, *Page* 82.

Example 2. In the Year 775 before *Chriſt* 00, in the ſecond Year of the thirty third *Cycle* and the tenth Month, there was an *Eclipſe* of the *Sun*.

Example 3. In the Year 246 before *Chrſt* 00, in the fiftieth Year of their forty firſt *Cycle*, there was an *Eclipſe* of the *Sun*.

Example 4, 5, 6. *Amos* viii. 9, 10. *It ſhall come to paſs in that day, ſaith the Lord God, that I will cauſe the ſun to go down at noon, and I will darken the earth in the clear day. And I will turn your feaſts into mourning, and all your ſongs into lamentation.* This *Prophecy* the *Chriſtian Fathers* have accommodated in an allegorical Senſe to the Darkneſs, which happened at the *Paſſover*, when *Our Saviour* ſuffered. And others think, that it may be fulfilled in a literal Senſe by three great *Eclipſes* of the *Sun*, which darkened their Days in the Time of their ſolemn Feaſts, when all their Males were obliged to appear at *Jeruſalem* before the *Lord*. And thus as *Thales* of *Miletus* was the firſt, who foretold *Eclipſes* by his Skill in *Aſtronomy*; ſo *Amos* amongſt the *Jews* foretold the *Eclipſes* of the *Sun*

Sun by the Inſpiration of the *Holy Ghoſt*. The firſt of theſe happened in the Year 790 before *Chriſt* 00, and of the *Julian Period* 3923. *June* 24, at the Feaſt of *Pentecoſt*. The ſecond happened in the Year 770 before *Chriſt* 00, and of the *Julian Period* 3943, on the eighth Day of *November* in the Feaſt of *Tabernacles*. And the other happened in the Year 769 before *Chriſt* 00, and of the *Julian Period* 3944, on the fifth Day of *May* in the *Feaſt* of Unleavened Bread. *Uſſerii Annales*, *Vol* I. *Page* 79.

Example 7. *Ptolemy* ſaith, *Lib*. 5, *Pag*. 25. *Ed. Gr.* That the *Moon* was eclipſed in the fifth Year of *Nabopollaſar*, which was the hundred and twenty ſeventh Year from *Nabonaſar*. This was in the 620th Year before *Chriſt* 00, and of the *Julian Period* 4093. And the firſt Month of the Year, or *Thoth*, began on the 26th Day of *January*. *Beverigii Chronol. Lib*. 2. *Cap*. 16, and *Lib*. 1. *Cap*. 10.

Example 8. In the ſixth Year of the War between the *Medes* and the *Lydians*, in the Year 600 before *Chriſt* 00, and of the *Julian Period* 4113, there was an *Eclipſe* of the *Sun* on the twentieth Day of *September*, which *Thales* of *Miletus* had foretold. This was the Year before *Jehoiakim* King of the *Jews* was ſlain by *Nebuchadnezzar*. *Uſſerii Annales*, *Vol*. I. *Pag*. 122.

Example 9. In the 20th Year of *Darius*, in the *Æra* of *Nabonaſar* 246, on the nineteenth Day of *November* about Midnight, there was obſerved an *Eclipſe* of the *Moon*. This was in the 500th Year before *Chriſt* 00, and in the Year of the *Julian Period* 4213, *Ptolemæi Magn. Syntax. Lib*. 4. *Cap*. 9. *Uſſerii Annales*, *Vol*. I. *Pag*. 164.

Example 10. *Ptolemy* tells us, *Magn. Syntax. Lib*. 4. *Cap*. 9. *Pag*. 101, That the *Moon* was eclipſed in the 31ſt Year of *Darius Hyſtaſpis*, in the *Æra* of *Nabonaſar* 257, on the third Day of the Month *Tybi* two Hours before Midnight, as it was obſerved in *Babylon*. To this Year add 3965, and the Total is the Year of the *Julian Period* 4222, which ſubſtracted from 4713, leaves the Year 491 before the Year of *Chriſt* 00. To know when it began, divide 257 by 4, and the Remainder is 64, which ſubſtracted from 422, the Remainder is 358, anſwering to *December* 24, in which the Year began *Anno Per. Julian.* 4222. To which add the Days to the third Day of the Month *Tybi* or 123, and the Total is 480, from which ſubſtract 365, and the Remainder anſwers to *April* 25, in the following Year, or the Year of the *Julian Period* 4223, and the Year 490 before *Chriſt* 00. *Beverigii Chronol. Lib.* 1. *Cap.* 10. *Sect.* 4. *Uſſerii Annales, Vol.* 1. *Pag.* 171.

Example 11. In the Year 430 before *Chriſt* 00, and of the *Julian Period* 4283, of the *Olympick Games* 87.2, and from the Building of *Rome*, according to *Varro*, 325, and in the firſt Year of the *Peloponneſian* War, on the third Day of *Auguſt hor.* 5. P. M. there was an *Eclipſe* of the *Sun* 10 Digits at *Athens*, which in ſome Parts of the Sea was Total, ſo that the Stars were ſeen, which frightned all the Navy except *Pericles* the Commander, who knew the Cauſe of it. *Thucydides, Lib.* 2. *Pag.* 100. *Edit. Hudſon. Uſſerii Annales, Vol.* I. *Pag.* 203. *Plutarch. in Periclem. Valerius Maximus, Lib.* 8. *Cap.* 11.

Example 12. In the Year 424 before *Chriſt* 00, and of the *Julian Period* 4289, of the *Olympick Games* $\frac{88.4}{89.1}$. and from the Building of *Rome* according to *Varro* 33$\frac{0}{1}$. and in the ſeventh Year of the *Peloponneſian* War, on the twenty-firſt Day of *March* toward the Evening, there was an *Eclipſe* of the *Sun*. *Thucidides, Lib.* 4. *Pag.* 243. *Edit. Hudſon. Uſſerii Annales, Vol.* I. *P.* 205. *Beverigii Chronol. Lib.* 2. *Cap.* 1. *Sect.* 17.

Example 13. In the Year 406 before *Chriſt* 00, and of the *Julian Period* 4307, of the *Olympick Games*, 91.4, and from the Building of *Rome*, according to *Varro* 341, in the nineteenth Year of the *Peloponneſian* War, on the 27th Day of *Auguſt*, when *Gylippus* and *Sicanus* returned to *Syracuſe*, there was an *Eclipſe* of the

Moon. With this *Eclipſe*, *Nicias* being terrified, when he was about to bring away the *Athenian* Army by Night from *Syracuſe*, delayed his Sailing, and ſo he loſt himſelf, and all that were with him. *Thucydides*, *Lib*. 7. *Pag*. 444. *Edit. Hudſon. Uſſerii Annales*, *Vol*. I. *Pag*. 207. *Beverigii Chronol. Lib*. 2. *Cap*. 16. *Sect*. 4.

Example 13. In the 405th Year before *Chriſt* 00, and of the *Julian Period* 4308, and of the *Olympick Games* 93. 3. when *Dionyſius* the Son of *Hermocrates*, being choſen Emperor by the Inhabitants of *Syracuſe* began his *Tyranny* againſt the Citizens, there was an *Eclipſe* of the *Moon* on the fifteenth Day of *April* three Hours ofter Sun-ſet. *Xenophon Hellen. Lib*. 1. *Uſſerii Annales*, *Vol*. I. *Pag*. 224.

Example 14. In the 404th Year before *Chriſt* 00, and of the *Julian Period* 4309, and of the *Olympick Games* 94. 1, when the *Athenians* conſtituted a Government of thirty Perſons, there was an *Eclipſe* of the *Sun* on the third Day of *September* in the Morning. *Diodorus Siculus*, *Lib*. 14. *Xenophon*, *Lib*. 2. *Uſſerii Annales*, *Vol*. I. *Pag*. 229.

Example 15. *Ptolemy Mag, Syntax. Lib*. 4. *Cap. ult*. *Pag*. 105. tells us, that when *Philoſtratus* was Governour at *Athens*, there was an *Eclipſe* of the *Moon* in the 366th Year of the *Æra* of *Nabonaſar*, on the 27th Day of the Month *Thoth*, which anſwered to the 23d Day of *December* at half an Hour after 5 in the Morning, which *Eclipſe* was but ſmall. This was in the Year of the *Julian Period* 4331, and the 381ſt Year before *Chriſt* 00. *Beverigii Chronol. Lib*. 2. *Cap*. 16. *Sect*. 5. *Uſſerii Annales*, *Vol*. I. *Pag*. 261.

Example 16. *Ptolemy*, *ibid*. tells us, that in the following Year, when *Philoſtratus* was Governour or *Archon*, on the 24th Day of the Month *Scirrophorion*, which anſwered to the 18th Day of *June*, there was another *Eclipſe* of the *Moon* at half an Hour after 6 in the Evening. *Uſſerii Annales*, *Vol*. I. *Pag*. 261.

Example 17. *Ptolemy* alſo tells us, *ibid*. that in the ſame Year, on the 16th Day of the Month *Thoth*, which anſwers to the 12th Day of *December*, when *Evander* was Governour of *Athens*, there was a Total *Eclipſe* of the *Moon* at half an Hour after nine in the Evening. So that here were three *Eclipſes* of the *Moon* obſerved by the Antients in leſs than the Space of a Year. *Uſſerii Annales*, *Lib.* 1. *Pag.* 261.

Example 18. In the Year 305 before *Chriſt* 00, and of the *Julian Period* 4408; and of the *Olympick Games* 94. 1, when *Crocinas* of *Theſſaly* won a Prize, *Xenophon* tells us, that there was an *Eclipſe* of the *Sun*, which happened accordingly on the third Day of *September* in the Morning. *Uſſerii Annales*, *Vol.* I. *Pag.* 229.

Example 19. In the Year 309 before *Chriſt* 00, and of the *Julian Period* 4404, *Diodorus Siculus* and *Juſtin* tell us, that when *Agathocles* the Tyrant of *Sicily* ſailed to *Africa*, that he might wage War againſt the *Carthaginians*, there was ſo great an *Eclipſe* of the *Sun*, that the Stars appeared, as if it was Night. This happened on the 15th Day of *Auguſt*. *Uſſerii Annales*, *Vol.* I. *Pag.* 446.

Example 20. In the Year 187 before *Chriſt* 00, and of the *Julian Period* 4526. *Livy*, *Dec.* 4. *Lib.* 8. tells us, that when *Livius Salinator* and *M. Valerius Meſſala* were Conſuls, there was a Total *Eclipſe* of the *Sun*, which fixes not only the Time, when theſe two were Conſuls, but alſo the famous *Epocha* from the Building of *Rome*, it being in the Year 566 from thence. This *Eclipſe* happened *July* 17. It began in the Morning 6^h. 51^m. Middle 7^h. 51^m. End 8^h, 51^m. Total Duration 2 Hours, Digits eclipſed at *Rome*, 12. *Beverigii Chronologia*. *Lib.* 2. *Cap.* 1. *Sect.* 16.

Example 21. In the Year 173 before *Chriſt* 00, and of the *Julian Period* 4540, *Ptolemy*, *Lib.* 6. *Cap.* 5, tells us, that in the 7th Year of *Ptolemy Philometor*, which is the 574th of the *Æra* of *Nabonaſar*, on the 28th Day of the Month *Phanemoth* according to the *Egyptians*, at half an Hour after two of the Clock in the Morning the *Moon* was eclipſed 7 Digits on her North Side, as it was obſerved at *Alexandria*. This was on the firſt Day of *May*, and fixes exactly the Beginnings of the Reign of *Ptolemy*, and of the *Æra* of *Nabonſar*. *Beverigii Chronol. Lib.* 2. *Cap.* 1. *Sect.* 13. *Uſſerii Annales*, *Vol.* II. *Pag.* 3.

Example 22. In the Year 167 before *Chriſt* 00, and of the *Julian Period* 4546, the Night before *Perſeus* was conquered, and the Kingdom of the *Macedonians* fell, 1 *Maccab.* viii. 5. when *Lucius Paulus Æmilius*, and *Licinius Craſſus* were Conſuls, and the *Æra* of the *Epocha* from the Building of *Rome* 586, as *Livy* relates it, *Dec.* 5. *Lib.* 4. there was a Total *Eclipſe* of the *Moon*. This began in *Macedonia* at 6^h. 14^m. the Middle 8^h. 18^m. and the End 10^h. 22^m, total Duration 4^h. 8^m. Digits eclipſed 15, and fixes the Time of this Battle, and when theſe two were Conſuls, and the famous *Epocha* from the Building of *Rome*. *Uſſerii Annales*, *Vol.* II. *Pag.* 24. *Beverigii Chronol. Lib.* 2. *Cap.* 1. *Sect.* 12.

Example 23. In the Year 140 before *Chriſt* 00, and of the *Julian Period* 4573, in the thirty ſeventh Year of the third *Calippick Period*, and of the *Æra* of *Nabonaſar* 607, *Hipparchus* obſerved an *Eclipſe* of the *Moon* in the Iſland *Rhodes*, about two Hours before Midnight, as *Ptolemy* tells us, *Lib.* 6. *Cap.* 5. This fixes the *Æra* of *Nabonaſar*, and of the *Calippick Period*. This *Period* conſiſted of 76 Years, which being doubled is 152, and the 37 added to it makes 189. This being ſubſtracted from the *Julian Period* 4573 leaves 4384, the Year in which the other *Period* began. *Ptolemy*, *Lib.* 6. *Pag.* 142, ſaith, that it happened on the ſecond Day of the *Egyptian* Month *Tybi*, which in that Year anſwered to *Jan.* 27. *Uſſerii Annales*, *Vol.* II. *Pag.* 98. *Beverigii Chronol. Lib.* 2. *Cap.* 7. *Sect.* 7.

Example 24. In the Year 103 before *Chriſt* 00, and of the *Julian Period* 4610, *Caius Marius* and *Caius Flaccus* being Conſuls, on the 19th of *July* there was an *Eclipſe* of the *Sun* almoſt Total at three of the Clock in the Afternoon. *Uſſerii Annales*, *Vol.* II. *Pag.* 131.

Example 25. In the Year 63 before *Chriſt* 00, and of the *Julian Period* 4650, *November* 7, a Comet appeared, and there was an *Eclipſe* of the *Moon*. *Uſſerii Annales*, *Vol.* II. *Pag.* 260.

Example 26. In the Year 50 before *Chriſt* 00, and of the *Julian Period* 4663, before the Wars broke out between *Cæſar* and *Pompey*, there was a total *Eclipſe* of the *Sun*, or at leaſt 10 Digits and an half, on the 7th Day of *March* a little after the Middle of the Day. *Uſſerii Annales*, *Vol.* II. *Pag.* 306.

Example 27. In the Year 49 before *Chriſt* 00, and of the *Julian Period* 4664, when the Wars were violent between *Cæſar* and *Pompey*, there was another *Eclipſe* of the *Sun*, on the 21ſt Day of *Auguſt*, of about 5 Digits. *Uſſerii Annales*, *Vol.* II. *Pag.* 317.

Example 28. There hath been ſome Difficulty in Fixing the Year of *Our Saviour*'s Birth. The *Vulgar Account* hath been eſtabliſhed for ſeveral hundred Years. But this not agreeing with the *Roman* Hiſtory, and the Hiſtory of *Joſephus*, hath occaſioned a farther Inquiry. Now *Joſephus* tells us, *Antiq. Lib.* 17. *Cap.* 8. that *Herod* died on, or ſoon after the *Paſſover*, and that the Month before, the *Moon* was eclipſed. This happened on the 13th Day of *March* three Hours after Midnight, in the Year 2 before the *Vulgar Account* of his Birth 00, and of the *Julian Period* 4711, and fixes the Time to be above three Years ſooner than the common Computation, *Dec.* 25. which alone (as *Whiſton* ſaith) is an evident Demonſtration of the right Time, far beyond all Traditions whatſoever. So that the true Account is this. *Our Saviour* was born on the ſeventh Day of *October* in the Year of the *Julian Period* 4710, and circumciſed on the fourteenth. His Mother was purified on the fifteenth Day of *November*, before the *Wiſe Men* came to her from the *Eaſt*; for if they had come ſooner, ſhe would have been able to have offered a Lamb on that Occaſion. About the End of this Year or the Beginning of the next, *Herod* ſlew all the Male Children in and about *Bethlehem*, and in or about the *April* following he died miſerably. *Whiſtoni Aſtronomia*, *Pag*. 176. *Uſſerii Annales*, *Vol.* II. *Pag*. 531 & 534.

Example 29. In the Year 5 after *Chriſt* 00, and of the *Julian Period* 4718, when *Auguſtus Cæſar* took upon him the *Proconſular* Dignity to finiſh the *Enrolling* or *Taxing* in *Italy*, the *Sun* had a partial *Eclipſe*, *March* 28, at five of the Clock in the Evening. *Uſſerii Annales*, *Vol.* II. *Pag*. 550.

Example 30. In the Year 14 after *Chriſt* 00, and of the *Julian Period* 4727, the *Pannonial Legions* having revolted ſubmitted themſelves to *Tiberius Cæſar*, being frightned by a total *Eclipſe* of the *Moon*, which happened on the 27th Day of *September*, 5 Hours after Midnight, ſo that the *Moon* did ſet eclipſed. *Uſſerii Annales*, *Vol.* II. *Pag*. 555.

Example 31. In the 32d Year after *Chriſt* 00, and of the *Julian Period* 4745. *Phlegon* tells us, that in the 4th Year of the 202d *Olympiad*, there was an extraordinary *Eclipſe* of the *Sun*, beyond what formerly happened, and it was about ſix of the Clock in the Afternoon, ſo that the Stars were ſeen as in a dark Night. The Year is known thus. Multiply the compleat *Olympiads* 201 by 4, the Total is 804, to which add 4, and alſo 3937, or the *Julian Period* before the Games began, and the Total is 4745, or the *Julian Period* for that Year. So that this could not happen on the Year of *Our Saviour*'s Crucifixion, but on the Year before. *Beverigii Chronol. Lib*. 2. *Cap*. 14. *Sect*. 6.

Example 32. In the 33d Year after *Chriſt* 00, and of the *Julian Period* 4746, on the third Day of *April*, when *Our Saviour* was crucified, the *Sun* was totally and miraculouſly darkened, for three Hours, and the *Moon* roſe eclipſed according to the Courſe of Nature in the Land of *Canaan*, the *Eclipſe* being above half ended. I know not, that this hath been taken Notice of by any other; but leave the Reader to judge, how agreeable the Fact is to *Joel* ii. 31. *compared* with

Acts ii. 16 *to* 22. *The ſun ſhall be turned into darkneſs, and the moon into blood, before the great and terrible day* of the Reſurrection *of the Lord ſhall come.* The *Moon* was partially eclipſed on her South Side, and the ſouthern Parts of the World lie even until this Time in groſs Errors and Darkneſs, whilſt we on the North Side of the *Equinoctial*, enjoy the Light of the Goſpel.

Example 33. In the 45th Year after *Chriſt* 00, and of the *Julian Period* 4758, *Claudius Cæſar* knowing from *Aſtronomy*, that there would be an *Eclipſe* of the *Sun* on his Birth-Day, and fearing that it might occaſion a Revolt, publiſhed before-hand an Account thereof, with its Duration and Quantity eclipſed, which happened on the firſt Day of *Auguſt* about ten of the Clock in the Morning. *Uſſerii Annales*, *Vol.* II. *Pag.* 649.

Example 34. In the 46th Year after *Chriſt* 00, and of the *Julian Period* 4759, *Valerius Aſiaticus* being a ſecond Time Conſul, the Mariners obſerved the Iſland of *Theraſia* in the *Ægean* Sea to appear again, after it had diſappeared ſeveral Years. This Year there was an *Eclipſe* of the *Moon* on the laſt Day of *December*. *Uſſerii Annales*, *Vol.* II. *Pag.* 652.

Example 35. In the 59th Year after *Chriſt* 00, and of the *Julian Period* 4772, there was a great *Eclipſe* of the *Sun* in *Campania*, on the laſt Day of *April* between ſeven and eight of the Clock, mentioned by *Corbulo* their General. This *Eclipſe* was ſo great at *Rome*, that the Stars appeared in the Midſt of the Sacrifices which were offered by the Decree of the *Senate* upon the Account of *Agrippina*, who was murdered by her own Son *Nero* the Emperor. *Uſſerii Annales*, *Vol.* II. *Pag.* 672.

Example 36. In the Year 673 after *Chriſt* 00, and of the *Julian Period* 5386. *Moawyah* the Emperor of the *Sarazens* had a Fancy to remove *Mahomet*'s Pulpit from *Mecca* to *Medina*; and when they were about it, to their great Surprize and *Aſtoniſhment*, the *Sun* was eclipſed to that Degree, that the Stars appeared, which made them deſiſt from their Enterprize. And when ſome Years after *Abdolmelik* had a Mind to remove it, one of the *Medinians* ſaid to him, *For God's ſake do not attempt ſuch a thing; for* Moawyah *did but move it once, and the Sun was eclipſed.* Upon which the Author ſaith, in the Margin, that this muſt be in the Year 54, for then there was an *Eclipſe* of the *Sun.* This *Mahometan* Year began *Dec.* 15, *Anno Chriſti* 673, and ended *Dec.* 4, *Anno Chriſti* 674. *Ockley's Hiſt. of the Sarazens, Vol.* II. *Pag.* 130.

Example the laſt, *Albatenius* in his Book *of the Science of the Stars, Cap.* 30. tells us, that he obſerved an *Eclipſe* of the *Sun* in the Year *Dhilkarnaim* 1202, or from the Death of *Alexander* the Great 1214 in the Month *Ab.* To know what Year this happened in the *Julian Period,* to 1202 add 4401, and the Total is 5603, in which Year the Year here mentioned began on the firſt Day of *October,* from which *Period* ſubſtract 4713, and the Remainder is the Year of *Chriſt* 890. Theſe are *Syriack* Months, according to which, the firſt Month, or *Tiſhrin the firſt,* began on the firſt Day of *October,* and the Month *Ab* began on the firſt Day of *Auguſt* following, *Anno Chriſti* 891. Now it appears from Calculation, that there was an *Eclipſe* of the *Sun* on the eighth Day of that Month. From whence it is obſerved, that both the *Philippian* and the *Alexandrian* Years began from the firſt Day of *October,* and that the fixed Years as well as the Erratick were applied to both theſe *Epochas. Beverigii Chronol. Lib.* 2. *Cap.* 16. *Sect.* 12.

Thus have I endeavoured, according to my poor Capacity and Infirmities, to give an Account of the Rectification of the *Golden Number,* and the Finding out of an *Ecliptick Number,* and the Uſe of both in Calculating the *New Moons* and *Eclipſes*; and wiſh that it had been done by a more able Hand. I ſuppoſe that many more Examples might be added, but theſe are more than ſufficient to ſhew the excellent Uſe of them. The Reader may obſerve, how the *Sun* and

Moon were appointed in Heaven, from the Creation, for natural *Signs*, and Fixing the exact Times of Hiſtory here on Earth, *and for Seaſons*, or ſettling the antient *Jewiſh Feaſts*, *and for Days and for Years*. The *New Moons* determine the *Scripture Chronology*, and teſtify the Morality of the *Chriſtian Sabbath*; and the *Eclipſes* demonſtrate the exact Times of the *Chronology* of the *Pagan* Hiſtory. Thus, *The heavens declare the glory of God, and the firmament ſheweth his handy-work*. The late Improvements in *Aſtronomy* ſhew his *Eternity* and *Immenſity*. The Contrivance of the Motion of theſe Heavenly Bodies, ſhews his infinite Wiſdom; and the Preſerving them in the ſame Order ſhews his infinite *Power* and *Providence*, ſo that they, who deny any of theſe Particulars, are without Excuſe. And therefore I ſhould think it impoſſible, but I am ſure, it is very abſurd, that any one, who hath Skill in *Aſtronomy*, can be either an Atheiſt or a Deiſt.

FINIS.

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